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AUGUST 22, 1940

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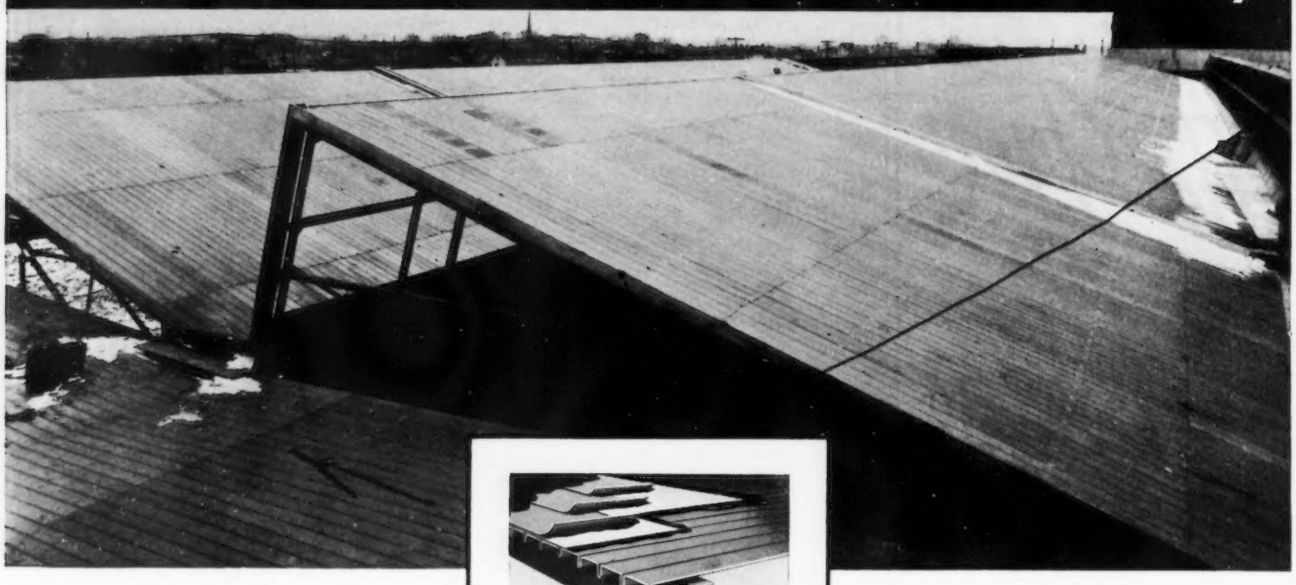

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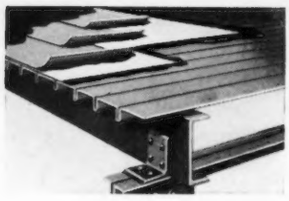

Cross section of Mahon Steel Roof Deck showing application of insulation and roofing material.

Section showing interlocking ribs of Mahon Steel Roof Deck and method of locking Deck Plates together and to supporting Purlins in welded construction.

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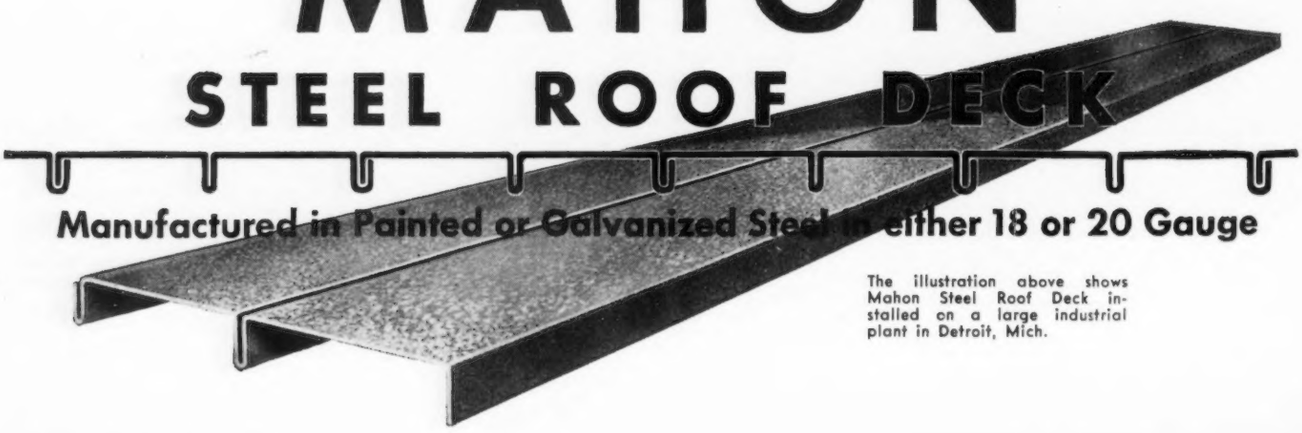

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The illustration above shows Mahon Steel Roof Deck installed on a large industrial plant in Detroit, Mich.

The Iron Age

AUGUST 22, 1940

ESTABLISHED
1855

A Chilton Publication

Jobs in 1942

PHIL MURRAY, vice-president of the C.I.O. and able head of the S.W.O.C., has done a good job for that portion of the steel industry which his union represents. In contrast with similar C.I.O. activities in motors, Murray has managed affairs with a minimum of friction and production interruptions because of differences between employers and workers.

I am handing him this "credit line" because he has earned it and not because of any love for the C.I.O., John Lewis, *et al.* But because some day a labor leadership will appear in this country that will recognize that the fundamental interests of employers and workers alike lie in the healthy progress and prosperity of industry with its multiplication of jobs and wages and its approach to a stability of employment.

It is a bit disillusioning, therefore, to read Mr. Murray's recent statement to the press in which he opposes the distinction between the obligations of military service "and the special privileges which corporations are going to enjoy."

Mr. Murray's inference is in tune with much of the current Administration's "anti-business" political propaganda. It requires no microscopic perception to detect that this attempt to reawaken class antagonism in this country is aimed at besmirching the Republican candidate because he happens to have been a successful industrial executive and a large employer of labor at union wages.

In line with this propaganda are the slams being taken at industry by New Dealers and kindred fellow travelers because of the desire of employers to have a clear understanding of what they are undertaking before they undertake it, and what effect this undertaking will have upon the survival of their businesses.

Now you may say that the desire of an employer to safeguard his business is a selfish one. But I will take issue with you on that.

The safeguarding of our industrial and other employment creating concerns so that they will survive this emergency is a public duty of high order because it means the safeguarding of employment opportunity under our American System of Enterprise. If the management of our industrial and other employing organizations are so short-sighted and so criminally negligent as to be stampeded into accepting conditions that will drive them into bankruptcy after war orders cease, then they will become agent provocateurs of totalitarianism because they will aid the Government to become the sole employer.

That is the system that is now in vogue in Germany and in Russia and we do not think that American labor, union or otherwise, wants any part of it.

The first and foremost duty of employers is to safeguard the continuity of their businesses, for this means the safeguarding of employment opportunity. Insofar as this affects the future welfare of millions, it is quite a different problem from that faced by the individual who may be called to war.

Keep this thought in mind when you read about the reluctance of industry to rush into the acceptance of half-baked contracts which may bring on fatal cases of acute industrial indigestion.

J. H. Van Deventer

"It's because we are turning out more parts, at lower cost," says this operating manager, "but that is only part of the story. Inland Quality Sheets and Inland Co-operation help us give our customers finer products and better service."

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Screw Threads

—The Effect of Method of Manufacture on the Fatigue Strength

By A. M. SMITH
Assistant Manager, Chicago Plant, Lamson & Sessions Co.

o o o

THE tensile strength of materials is well known. However, the fatigue strength, or endurance limit as it is frequently called, is not generally understood. It is perfectly obvious why some material such as steel fails when pulled apart. But it is not so clear why the same material fails if subjected to a stress that will not pull it apart, but which stress is alternately applied and removed.

For example, a piece of steel might have a tensile strength of 100,000 lb. per sq. in. But if the same piece of steel is subjected to a tensile stress of 70,000 lb. per sq. in., which is alternately removed, applied, again removed and so forth, for hundreds of times, the piece of steel will eventually break. Most materials will stand such repeated application of stress indefinitely until the stress reaches a certain point. Above this stress, failure will occur and the higher the stress, the fewer applications are necessary to cause failure. The stress below which the failure will not occur under repeated stress is called the fatigue strength, or endurance limit.

Some materials have a rather definite ratio between the endurance limit and the tensile strength, while others do not. Fortunately, steel does have such a ratio. For a smooth, polished piece of steel, this ratio is about 45 per cent to 55 per cent. Thus a piece of steel with a tensile strength of 100,000 lb. per sq. in. cannot be safely loaded with a repeated load of much over 45,000 lb. per sq. in.

However, that ratio is good only for a perfectly smooth specimen. If there are any notches, grooves, threads or other irregularities on the steel, the ratio is lowered. It is necessary to know how much the ratio is lowered, for if it drops to 25 per cent, a design factor of safety of 4 is wiped out. Screw threads are a very common form of irregularity on steel. It is the purpose of this investigation to find out what effect the method of manufacture of the thread has upon the ultimate tensile strength, the fatigue limit and ratio between the two.

Three manufacturing methods were selected: (a) cut threading; (b) roll threading on single extruded wire; and (c) roll threading on double extruded wire. Cut threading is well known. In the second method, wire with a diameter the same as the desired outside diameter of the thread is first extruded to pitch diameter, and then the threads are rolled on the extruded portion using suitable dies that depress part of the steel to form the root of the thread and force the other material up to make the top of the thread. In the third method, the original diameter of wire is larger than the desired outside diameter of the thread. This is first extruded to the desired outside diameter, then extruded to pitch diameter, and finally the threads are rolled upon the reduced wire.

It is well known that cold working increases the tensile strength of steel. Thus, of the above methods of manufacture, cut threads are weakest and rolled threads on double extruded wire are strongest because of the cold working effect. The same would be expected of the fatigue limit of the threads.

Past investigation of the fatigue limit of screw threads has been largely concerned with the fatigue irrespective of the method of manufacture. In 1926, R. R. Moore made tests on the effect of grooves and threads upon the endurance limit using the rotating beam type of test.[1] His tests were made on heat treated S.A.E. 1045 steel. For ⅜-24 threads, he found the endurance limit to be 23.7 per cent of the ultimate strength. However, the endurance limit of a smooth specimen of the same material, also heat treated, was only 34.9 per cent of the ultimate strength. Apparently this low ratio of endurance limit to ultimate strength is caused by the heat treatment. This is also indicated by experiments made by D. J. McAdam, Jr. in 1924 on S.A.E. 1025 steel.[2] The ratio for his steel as received from the manufacturer was 42.2 per cent, but heat treatment reduced this to 37.4 per cent. However, Mr. Moore's results above

[1] "Effect of Grooves, Threads and Corrosion upon the Fatigue of Metals," Proceedings of the A.S.T.M., 1926, Part II.

[2] "Endurance Properties of Steel," Proceedings of the A.S.T.M., 1924, Part II.

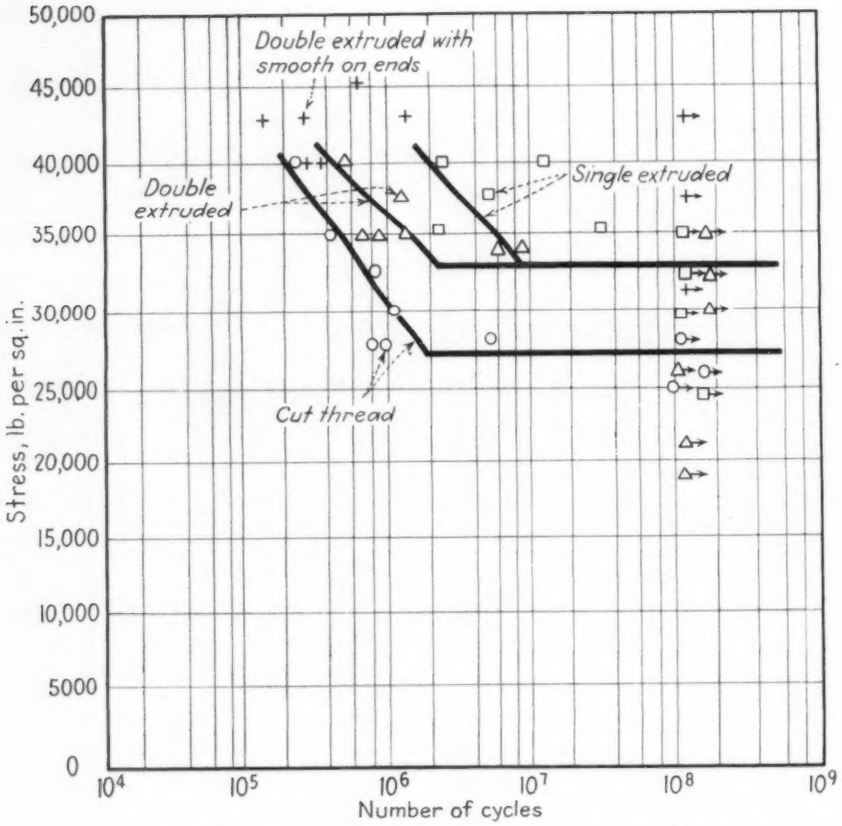


Fig. 1—Fatigue curves. Data tabulated in tables III, IV and V.

TABLE I

Chemical Analysis of Specimens

Tests	Carbon	Manganese	Sulphur	Phosphorus
Single extruded and cut thread specimens	0.26	0.57	0.025	0.022
Double extruded specimens	0.22	0.47	0.024	0.022

TABLE II

Physical Data on Material

Type Test	Brinell Hardness on Cross-section	Yield Point, Lb. Per Sq. In.	Ultimate Strength, Lb. Per Sq. In.	Reduction in Area, Per Cent	Elongation in 10 Ins., Per Cent
Cut thread and single extrude:					
Rod	119	32,200	66,400	62.8	26.7
Wire	171 to 193	47,900	89,300	54.5	3.6
Double extrude:					
Rod	93 to 114	44,000	59,000	62.5	26.5
Wire	150 to 160	59,000	77,400	48.9	4.2

TABLE III

Endurance Tests for Cut Thread Samples

Specimen Number	Stress, Lb. Per Sq. In.	Cycles	Remarks
1	40,000	273,000	Failed
2	35,000	437,000	Failed
3	32,500	888,000	Failed
4	30,000	1,100,000	Failed
5	27,500	104,182,000	Did not fail
6	27,500	840,000	Failed
7	27,500	5,560,000	Failed
8	27,500	822,000	Failed
9	26,000	126,079,000	Did not fail
10	25,000	103,215,000	Did not fail

Endurance Limit = 27,000 lb. per sq. in.

indicate that the endurance limit is reduced very much by the presence of the threads, the ratio for the threaded specimens being 68.0 per cent of that for the unthreaded specimens.

The heat treatment mentioned above and elsewhere in this article consists of heating the steel above its critical temperature, quenching in oil or water and drawing at some temperature below the critical temperature.

H. F. Moore and P. E. Henwood have made tests of screw threads under repeated tension.[3] These tests covered U. S. Standard and Whitworth die cut threads and rolled threads, presumably of the U. S. Standard form. Unfortunately, as they themselves state, the results of the cut thread tests and the rolled thread tests cannot very well be compared for the reason that the rolled threads extended the full length of the specimens, while the cut threads exposed to the full stress were only one or two threads on each end. It has been proved that the exposed length of the thread has a definite effect upon the tensile strength, the greater the length of exposure the less the strength. Thus, with a definite relationship between tensile strength and fatigue limit, the length of thread exposure is of importance. This is also substantiated by recent European experiments on fatigue.[4] Moore and Henwoods' experiments show the ratio of endurance limit to tensile strength for the rolled threads to be about 7 per cent higher than the ratio for cut threads, but this may be affected by the length of thread exposed.

The fact that rolled threads are stronger than cut threads in endurance as well as tension is confirmed by the European experiments just mentioned. This increase in endurance limit found in Europe seems much larger than would be expected. R. P. Seelig states that one investigator has increased the fatigue of rotating beams up to 34 per cent by roll threading.

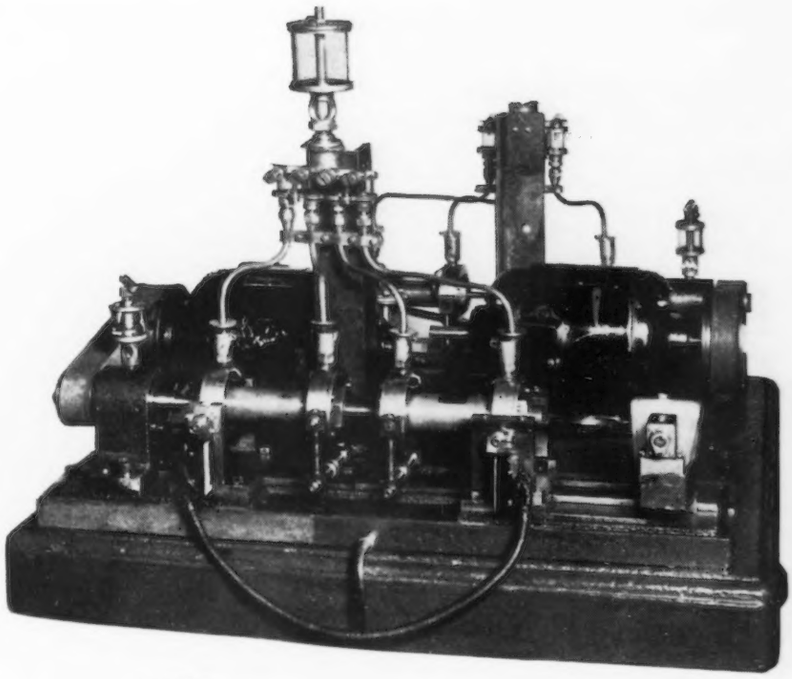
The fatigue tests for the present investigation were made on special machines of the Sondericker type in which the specimens are loaded like a simple beam which is then rotated rapidly. Thus the "fibers" of steel in one rotation are stressed in tension and then in compression. Each revolution of the specimen gives one complete reversal of stress from maximum tension to maximum compression and back to maximum tension.

[3] "Screw Threads Under Repeated Tension," Bulletin No. 264, Engineering experiment Station, University of Illinois.

[4] "Recent European Experiments on Fatigue," by R. P. Seelig, Bulletin of the A.S.T.M., October and December, 1938.

All specimens were made with ⅜-24 American Standard threads and were 4 in. in length. The tensile and the impact-tension specimens were all made with full threads the full length of the specimens. The fatigue specimens were made with 1 in. of full threads in the middle of the specimen. In order to avoid undue stress concentration at the ends of the full size threads, additional threads were made which ran from the full size thread to nothing along a curve of 9¼-in. radius on each side of the center section of full threads. One inch on each end was left blank for gripping in the testing machine.

The thread form as standardized by the National Screw Thread Commission specifies a V thread with a flat section on the top and bottom of the thread. It has been found that in cutting or rolling threads, the tools rapidly wear or chip off the sharp corners where the side of the thread meets the flat section on top of the thread on the tool. This soon results in an approximate radius on the top of the threads on the tool, rather than a flat section. This in turn makes the bottom of the thread on the screw a radius rather than a flat section, somewhat similar to the radius on Whitworth threads. The experiments of Moore and Henwood previously mentioned show that the Whitworth form of thread has a higher endurance limit than the American National form of thread. This has also been proved by several other investigators. For this reason the Lamson & Sessions Co. preferably uses threading tools having a radius on top of the thread rather than a flat. This radius does not affect the fit of the finished thread. Therefore, the specimens in this investigation were made with a radius in the bottom of the thread rather than the theoretically standard flat section.



ABOVE

FIG. 2—Side view of fatigue testing machine.

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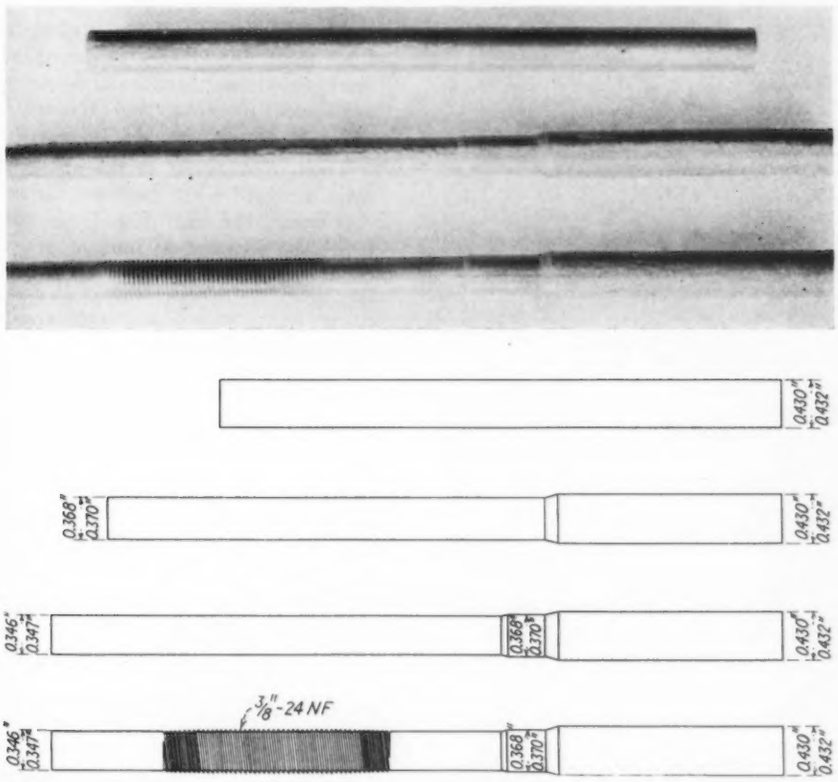
BELOW

FIG. 3—First operations in making double extruded roll thread specimens.



Since this investigation covers screw threads as produced commercially, standard bolt and screw machinery was used wherever possible. The only exception was that the fatigue specimens for cut threads were made in a lathe because the necessity of having blank ends for gripping in the testing machine made it impossible to use commercial cut threaders.

Usually the tensile strength of screw threads is expressed in lb. per sq. in. based on the area at the root of the thread. However, as there is some additional strength due to the thread, this method gives a higher tensile strength for the thread than is accurate. Tensile strength based on area of pitch diameter (halfway between the root diameter and the outside diameter) gives too low values. E. M. Slaughter[5] has shown that the most accurate area for this purpose is the mean area which is figured on the mean of the root and pitch diameters. As it is necessary to have an accurate comparison of strength of the thread with the strength of unthreaded mate-

[5] "Tests on Threaded Sections," Metal Progress, March, 1933.

TABLE IV

Endurance Tests for Single Extruded Specimens (With Rolled Thread)

Specimen Number	Stress, Lb. Per Sq. In.	Cycles	Remarks
1	25,000	123,400,000	Did not fail
2	30,000	100,001,000	Did not fail
3	35,000	2,121,000	Failed
4	40,000	2,520,000	Failed in collet
5	32,500	110,960,000	Did not fail
6	37,500	5,696,000	Failed in collet
7	35,000	102,590,000	Did not fail
8	40,000	1,370,000	Failed in collet
9	35,000	33,513,000	Failed in collet

Endurance Limit = 33,000 lb. per sq. in.

TABLE V

Endurance Tests for Double Extruded Specimens (With Rolled Threads)

Specimen Number	Stress, Lb. Per Sq. In.	Cycles	Remarks
1	18,900	102,900,000	Did not fail
2	21,200	100,760,000	Did not fail
3	25,550	100,021,000	Did not fail
4	30,000	100,006,000	Did not fair
5	35,000	842,000	Failed in collet
6	35,000	1,672,000	Failed in collet
7	35,000	785,000	Failed end of threads
8	34,400	6,128,000	Failed in collet
9	35,000	100,002,000	Did not fail
10	34,400	8,469,000	Failed end of threads
11	40,000	546,000	Failed end of threads
12	37,500	1,117,000	Failed in collet
13	32,500	100,000,000	Did not fail

Endurance Limit = 33,000 lb. per sq. in.

TABLE VI

Tension-Impact Strength (In Foot Pounds)

CUT THREADS	SINGLE EXTRUDE ROLLED THREADS	DOUBLE EXTRUDE ROLLED THREADS
202	168.5	139
215	168	163.5
172	196.5	141
190.5	202.5	139
218	209.3	147
210.5	168	150
197.8	208.5	138.5
Did not fail	Did not fail	141.8
202	181	148.5
Did not fail	190	143
Did not fail	Did not fail	
Did not fail	208	
222.5		
196.5		
	Average of specimens which failed	
202.7	190.0	145.1

TABLE VII

Summary of Results of Experiments

TYPE Specimen	Ultimate Strength, Lb. Per Sq. In. Wire	Specimen	Endurance Limit, Lb. Per Sq. In.	Ratio of Endurance Limit to Ultimate Strength, Per Cent Wire	Specimen	Tension-Impact Strength, Ft.-Lb.
Cut thread	89,300	90,000	27,000	30.3	30.0	202.7
Single extrude and roll thread	89,300	99,700	33,000	37.0	33.1	190.0
Double extrude and roll thread	77,400	99,600	33,000	42.6	33.1	145.1

rial, mean areas have been used throughout this article in computing the strength of threads.

Table I shows the chemical analysis of the specimens, while Table II gives the physical properties of the rod and wire from which the specimens were made. Tables III, IV and V show the numerical results of the fatigue tests, while Fig. 1 shows the same thing in graphical form.

With regard to ultimate tensile strength, the tests show that:

(1) Cut threads are as strong in tension as the material used.

(2) Single extruding and rolling threads increase the tensile strength about 12 per cent over that of the original material.

(3) Double extruding and rolling threads increase the tensile strength about 28.5 per cent over that of the original material.

With regard to the effect on the endurance limit of the method of manufacture, the tests indicate that:

(1) Cut threaded specimens have an endurance limit about 30 per cent of the ultimate strength of the threads, and also of the original material.

(2) Single extruded and roll threaded specimens have an endurance limit about 33 per cent of the ultimate strength of the thread, and about 37 per cent of the strength of the original material.

(3) Double extruded and roll threaded specimens have an endurance limit about 33 per cent of the ultimate strength of the thread and about 42.6 per cent of the strength of the original material.

Thus, if material of the same ultimate strength were used for all three specimens, the cut thread specimens would be weakest in tension and endurance, the single extruded and roll threaded specimens would be next, and the double extruded and roll threaded specimens would be strongest.

It is a little surprising that the ratio of endurance limit to the ultimate tensile strength of the thread is not higher for the double extruded specimens than for the single extruded specimens. In Table V it is noted that all failures in endurance for the double extruded and roll threaded specimens occurred either at the end of the threaded section or in the collet. At either of these points the diameter is greater than that at the full thread section. Therefore, there must have been stress concentration at these two points to cause failure there before it occurred in the threads, or else the

rolling of the threads actually increased the strength of the threaded section over that of the blank ends. Thus, the endurance limit as found in the tests is probably not the true endurance limit for the thread.

In an attempt to find this true endurance limit, specimens were made with full threads the entire length of the blank. The threads on each end of the samples were then filled with Smooth-On Cement, which, when hardened, was turned to a cylindrical section concentric with the threads in the middle of the specimen. This method produced specimens with the outside diameter of the ends slightly larger than the outside diameter of the thread. In testing, the Smooth-On frequently broke out of the threads on the ends. However, the results to date indicate that the endurance limit is higher than found in the other tests. These tests are being continued and it is hoped that some material can be found that will perform the same function as the Smooth-On more effectively.

Comparing these results with those of previous investigators shows that in all three methods of manufacture, these results gave a higher ratio of endurance limit to ultimate tensile strength of the thread. Thus, R. R. Moore found a ratio of 23.7 per cent for heat treated S.A.E. No. 1045 steel while H. F. Moore and P. E. Henwood found a ratio of 22.6 per cent for cut threads and 27.0 per cent for rolled threads, using a 0.30 carbon steel.

It would be expected that the results of Moore and Henwood would show a higher ratio than that of R. R. Moore, because the former was for repeated tension only while the latter was for alternating tension and compression. However, the heat treating of R. R. Moore's specimens may be the cause of the closeness of the figures. The fact that all previous results are lower than the results in these tests is probably due to the fact that previous threads had the sharp corners at the bottom of the thread while the present tests have a radius. If this is the only cause of the discrepancy in results, then the presence of the radius has increased the ratio of endurance limit to ultimate tensile strength 32.7 per cent for cut threads. However, it must be remembered that Moore and Henwood's cut thread samples had very few exposed threads which would affect the ratio for their tests. In spite of this fact, it is evident that the radius at the root of the thread has increased the endurance limit very much.

Table VI shows the results of ten-

TABLE VIII

Endurance Tests for Double Extruded Specimens

Specimens threaded full length and threads on end filled with Smooth-On to make section of specimen in collets larger than the outside diameter of the thread.

Specimen Number	Stress, Lb. Per Sq. In.	Cycles	Remarks
1	37,500	121,078,000	Did not fail
2	45,000	615,000	Failed
3	40,000	395,000	Failed
4	42,500	158,000	Failed
5	42,500	328,000	Failed
6	40,000	487,000	Failed
7	42,500	1,257,000	Failed
8	32,500	100,000,000	Did not fail
9	42,500	100,000,000	Did not fail

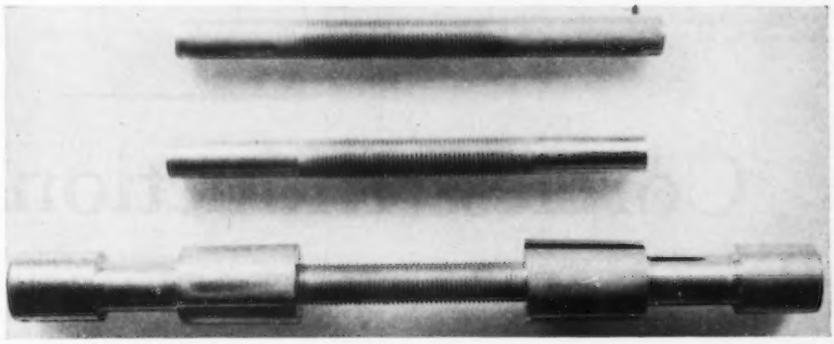


FIG. 4—Finished specimen before and after clamping in collets.

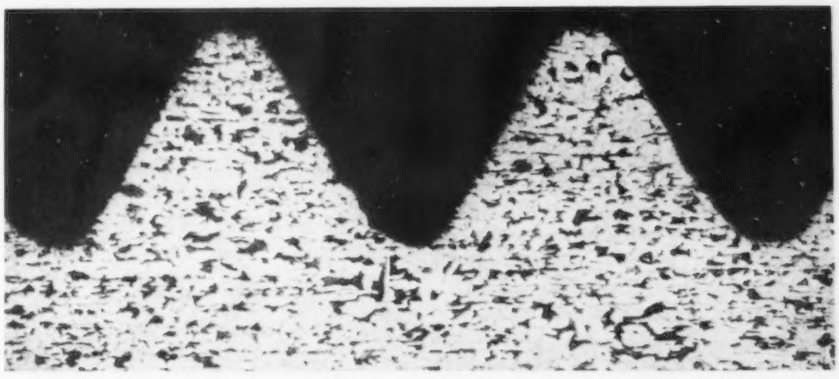


FIG. 5—Longitudinal section of cut thread specimen. 100 magnifications.

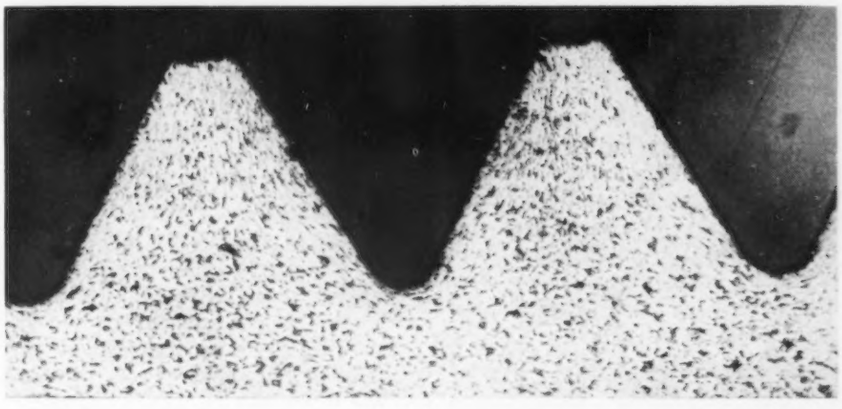


FIG. 6—Longitudinal section of rolled thread specimen. 100 magnifications.

sion impact tests made on the specimens. Experiments have failed to show any definite relationship between impact strength and ultimate tensile strength. At present, impact testing is receiving a great deal of study and the theories of this type of test are not as well clarified as for other types of tests. This is especially true since the experiments of H. C. Mann,[6] of the Watertown Arsenal, on high velocity impact tension tests. It seems that impact tension tests are more reliable than impact bending tests; and that, at the relatively slow speeds of Charpy and Izod testing machines, the results indicate only the general effect of the shape, size and strength of the material under one particular set of conditions. In this case the tension-impact tests were made on an Izod machine and indicate that the extrusion process reduces the impact-tension strength of the thread slightly for single extrusion and more for double extrusion.

All of these tests were made on not heat treated specimens and under favorable conditions. The effect of heat treatment on the fatigue limit is not known, but it is known that it increases the tensile strengh. It is not known that vibration of the specimen during testing lowers the fatigue limit. If such vibration is very great, the fatigue strength is unpredictable.

[6] "High Velocity Tension-Impact Tests," Proceeding of the A.S.T.M., 1936, Part II.

Summary

Cut threading has no apparent effect upon the physical properties of the original material and the endurance limit is about 30 per cent of the ultimate tensile strength. Single extruding and rolling threads increases the ultimate tensile strength and endurance ratio while decreasing the tension impact strength slightly. Double extruding and rolling threads increases the ultimate tensile strength and the endurance ratio the most and reduces the tension impact strength the most.

Comparison with other investigations indicates that a round bottom thread has a higher ratio of endurance limit to ultimate tensile strength than the standard thread form with sharp corners at the bottom of the thread.

Coreless Induction Furnaces

REVIEWING recent progress in Germany in the design and applications of the coreless induction furnace, O. Dorrenberg and W. Bottenberg, in a paper in *Stahl und Eisen*, abstracted by *Iron and Coal Trades Review*, point out that the first furnace of this type for continuous operation erected in Germany was installed exactly 10 years ago, in 1930. Since that date the total number of furnaces of this type in Germany has grown to 140 with an installed generator output of nearly 40,000 kw.

The authors suggest that the favor which these furnaces have enjoyed is due to their general operating and metallurgical advantages, the ease with which they can be adapted to a variable and highly flexible production program, the absence of local superheating and the certainty with which the optimum melting and pouring temperatures can be reproduced, the rapid and complete solution of high melting point alloy additions, and finally satisfactory consumption ratings and low melting losses.

The capacities of these furnaces have been steadily increased; the first furnaces had a capacity of several hundred kilograms, while the latest can take charge of six and even eight tons. There is as yet no sign that the maximum capacity has been reached, and furnaces are now being designed with a capacity of 10 tons. The general design of the two principal German types of coreless induction furnaces is shown in Figs. 1 and 2.

In coreless induction furnaces, the most important element is the coil, and many attempts have been made to improve the efficiency of these coils. Little success has attended the substitution of the simple cylindrical coil by specially shaped coils or air cooled coils in which the coil losses are not excessive. Up to the present, the water cooled type of coil has proved the most efficient and practicable. An idea of the dimensions of a coil may be gathered from the following data for a 6-ton furnace; this coil has an internal diameter of 1160 mm. (about 45 in.), is 1230 mm. high, and has a copper section of 60 by 61 sq. mm., its total weight being 2.5 tons. The high mechanical and thermal stresses to which the coil is exposed are taken up by asbestos rings and vertical bars respectively. In the latest furnaces the coils are firmly anchored to the bedstones, while in some, tension bars are introduced to press the coil hard down, on to the base plate, leaf springs being added to equalize the tension in the bars.

By far the majority of modern coreless induction furnaces are run on the acid principle, a plastic refractory clay being used as lining, with which crucibles have in some cases exhibited a life of 55 melts.

Work devoted to devising a suitable basic lining has been carried out in recent years in Germany, as the steady increase in the capacity of the furnaces led to an expansion in the consumption of lower-grade materials. The difficulties, at first serious, have been overcome by making a lining from special magnesites.

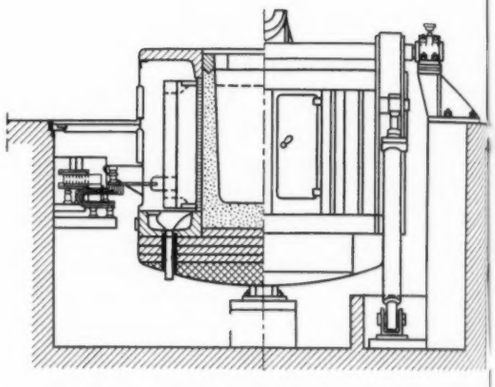


FIG. 1—Standard German type of coreless induction furnace.

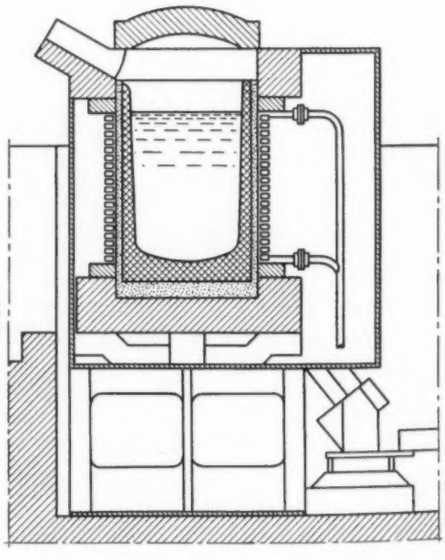


FIG. 2—Another standard German type of coreless induction furnace.

Deficiencies of Defense

By COL. H. A. TOULMIN, JR.

CONCLUDING the chapter on "Deficiencies of Defense," in Col. Toulmin's series, the author now deals with necessary reorganization of our thinking with respect to the civilian army. A part of this has to do with the elimination of "politics" from the relations between Washington and the National Guard. Even more important is the aspect of adequate facilities for instructing personnel for the O.R.C. as well as the Guard organization. Under the existing conditions, says Col. Toulmin, "there is as much chance of winning a war with this type of army as of killing a wildcat with a custard pie."

WHEN you put together in a single corps a "race horse" division of 11,000 men capable of moving 50 to 200 miles a day and then team with this division two heavy "mule" divisions of 20,000 men crawling along slowly at a speed of from 10 to 15 miles a day, you cannot synchronize the two component parts or three component parts of such a corps because they do not fit. Their timing is entirely divergent, their organization is different, their logistics of supply is different, their arms and equipment are different. This hastened organization will be just as barren of results as the traditional mule hitched to a race horse with both hitched to a plow.

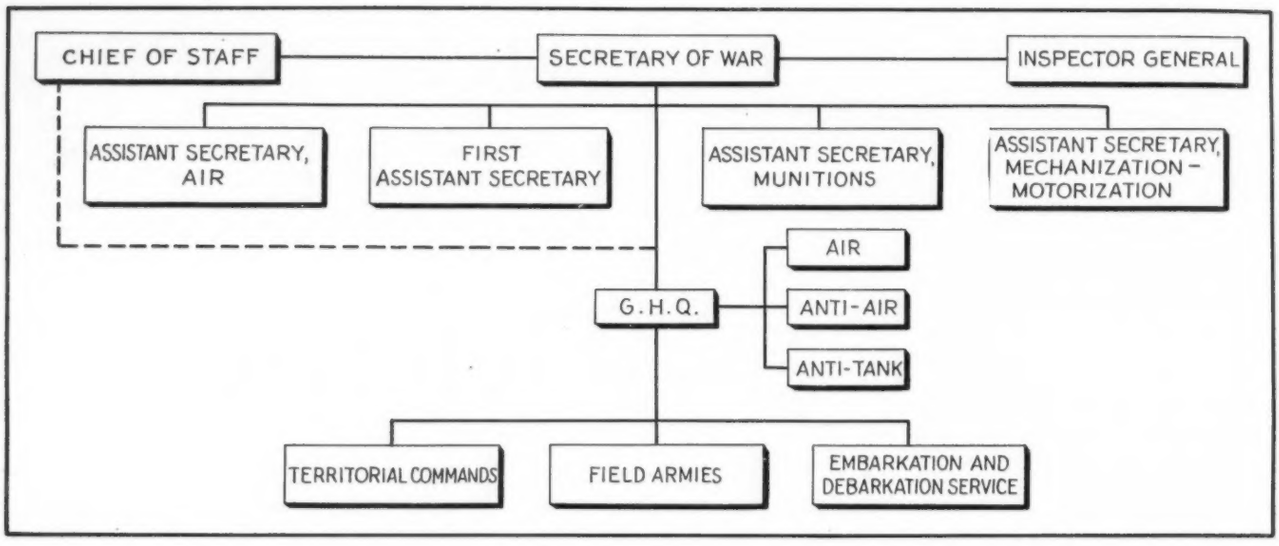
In military affairs the speed of any unit of a military organization is the speed of the slowest member of that unit. Why then should we develop these highly organized mechanized and motorized swift and hard hitting army divisions and then team them with the National Guard division that is equipped and organized on the old basis?

The answer lies in the single word "politics." The Regular Army and the National Guard bureau of the War Department are afraid to tackle the situation. The National Guard is one of the most important, and influential politically, organizations in the United States. It is in a position to cause the Regular Army great difficulties in Congress. It has done so in the past and expects to do so in the future. The National Guard still remembers with bitterness the reorganization of its divisions the Regular Army gave it during the World War. The scars and bitterness of those events still remain.

So the Regular Army has left the National Guard divisions strictly alone. In the course of such a reorganization from 20,000 men to 11,000 men, many politically powerful senior officers from General to Field Officer would lose their positions due to the fact of the necessary reorganization in the state and between the states. There would be many shifts of squad units in many counties. The hierarchy of the National Guard would be altered by any such reorganization and drastic reorientation. The thing however that the Regular Army does not understand is that by and large the National Guard of the United States is composed of one of the most patriotic and loyal groups of men that exists in this entire country. Such political fear is entirely groundless, but it has kept the Regular Army from taking the drastic steps that every one of the informed officers of the Regular Army of the United States knows is absolutely necessary to the essential welfare of this country. All our divisions, regular, reserve and National Guard should be organized and equipped alike—a national army.

N. G. Physical Fitness

Furthermore, the Regular Army of the United States has not enforced their regulations as to the physical fitness of the officers of the National Guard. A large proportion of the senior officers and many of the officers in senior positions in the National Guard are physically unfit for field



duty. The medical examination of these men has been largely left to the doctors who are National Guard officers in the National Guard outfits. Regulars have pulled their punches on this matter and have failed to take drastic steps to provide the most competent officers in the best physical shape in order to lead the National Guard troops. The best proof of this is to ask any well informed National Guard officer in any National Guard outfit and he will tell you that this is a fact.

There is no finer group of officer material nor finer group of enlisted men than in the National Guard. But one of the other peculiar regulations of the Regular Army as to National Guard is the enforcement of the rule that no married men shall be allowed to remain as enlisted men in the National Guard. This has eliminated many of the trained non-commission officers upon whom thousands of dollars for training and years of experience have been lavished in order to build up the organization of the National Guard. In the very face of the state of world affairs the Regular Army has been consistently enforcing such regulations and evicting from the National Guard the very best non-commission officers and potential duty officers of that outfit.

Insufficient Training

The National Guard of the United States has not been given the opportunity for training that it should have had. This is largely due to the fact that the Regular Army has not boldly come out and told the country and Congress the need for the extended training necessary for the National Guard and any other similar outfit in order to perform its functions in any way that would be of any advantage to this country.

I understand in one of the recent maneuvers in the south a National Guard division staff in command, temporarily, of a Regular Army division lost it completely and was unable to find it for several days on a small terrain of a few thousand acres. A short time ago one of the very best of our National Guard divisions entered into maneuvers and the Adjutant General of the state from which the division came publicly announced that the division was incapable of functioning even in a peace time maneuver because its division staff was incapable of handling the men involved and subsequent events proved that he was not only correct, but quite conservative in his prediction.

During that same maneuver a National Guard outfit went without food for as long as 24 hr. because the National Guard officers or the Regular Army or both were unable to organize themselves on a peace time terrain of not more than 40,000 acres so as to supply the troops for three meals a day.

The O. R. C.

Now let's turn to the nation's third line of defense. I refer to the Officers Reserve Corps and the organization of their reserve divisions, brigades and regiments. In the first place, the Regular Army of the United States has never organized the staffs and line of the Reserve Divisions, the staffs of Reserve Brigades or other collateral troops that are necessary for the organization, management and functioning of a division. These positions have been held open and vacant for the good reason that they expect to fill these positions mainly by Regular Army officers in time of war. These are the positions that were designed by Congress to be filled by reserve officers in reserve divisions. Millions of dollars have been spent on the reserves for that purpose. Those positions should have trained men put in from civil life in order to manage the reserve divisions. There are not enough Regular Army officers to fill these staff positions. There are fewer still who are competent to do so. Fortunately, the civilian occupations of many of the reserve officers admirably fit them for the business management function of a general staff officer of this character. It would not cost one cent to do this and get the necessary team work of these staffs—a thing that has made Germany so superbly successful.

In addition, regiments constituting the brigades are organized in such a manner that the officers are widely scattered. In one case of one of the leading regiments the officers have not seen at any time some of the principal weapons that they are expected to use in time of war. Even during their training periods they have not seen many of these weapons.

This regiment, which is typical of most regiments of the United States, does its peace time training in winter with pieces of paper and pencils on paper problems. It is not furnished any equipment of any sort such as rifles, machine guns, or other apparatus of war of which there is an

ample supply in the possession of the Regular Army. Instead of letting these men have the opportunity in suitable quarters of becoming familiar with the matériel they will need to fight in time of war, this same matériel has been locked up in armories and in storehouses of the Regular Army.

The reason for this is that the Regular Army officers on duty with the reserve would be charged with property responsibility and they do not want to be bothered with this difficulty of keeping track of Government property.

Inadequate Training Quarters

The Regular Army puts up no battle for the reserves to provide them adequate quarters in which to train and be instructed. Aside from a few officers in office buildings or in post offices, the Reserve Officers have had no place to meet or no place to be instructed. There are no armories and no opportunities for dealing with troops except for a limited period during the summer training period.

These men have contributed their services for nothing, except for the small compensation received for two weeks when on active duty training, for one to two years out of every three. Yet they are expected in one day to immediately mobilize and to be fully trained and competent to take over the organization and management of thousands of young men, your sons, brothers and the husbands who constitute the brave youth of this nation.

There is just as much chance of winning a war with this type of army management as killing a wildcat with a custard pie.

Our fundamental trouble is a lack of civilian coordination and too much political ballyhoo and jockeying. We must get down to business.

Recommendations for National Defense

(1) An Inspector General of the Army with adequate organization reporting direct to the Secretary of War and responsible to him only for the field efficiency of the armed forces.

(2) Assistant Secretaries of War in charge of mechanization, ordnance and air corps procurement with inspection staffs reporting direct to them independent of the Army.

(3) Assistant Secretaries of War who are engineers and manufacturing executives—not political lawyers.

(4) Promotion in the Army to be based, above rank of Captain, on record and examination by a mixed board of civilian executives accustomed to selecting men, the regular army and at least one-third of the board being comprised of civilian officers. These boards to be under control of Inspector General of the Army.

(5) A complete revision and elimination of that board of officers in the regular Army, National Guard and Reserves.

(6) The establishment of independent commands of each field army and territorial army completely under it in command of the General Staff.

(7) The elimination of the General Staff from command functions.

(8) The establishment of regional command and staff schools for civilian officers.

(9) The assignment of Reserve Officers to all educational work in the army to relieve regular personnel.

(10) The establishment of trained embarkation and debarkation forces.

(11) The establishment of a matériel experimental division for constant study and test of new matériel in the field.

(12) The organization of a "breakdown" division on present equipment to operate it to destruction to discover its usefulness.

(13) The re-establishment of a Chief of Staff for operation divisions and reinstatement of Brigadier Generals in command of infantry and field artillery in divisions. The present division is insufficiently staffed for 24-hr. war-time service.

(14) The adoption of slow, highly maneuverable divisional aviation for observation and fire control, preferably of autogiro type that needs no special landing fields.

(15) The elimination of map training of officers and the full training in aerial photography.

(16) Reorganization of guard divisions.

(17) Organize complete reserve divisions as to staffs and command and train their officers together as a team.

(18) Organization on a permanent basis of army and corps headquarters with technical and general staff components.

(19) Rotation of officers in command of other branches than their own to teach limitations and needs of coordinate arms and team work.

(20) The simplification of all Army orders in the field and the practice of the principle of giving objectives, leaving details to be executed according to standard training. Army orders until recently have been detailed training directions.

(21) School for training in "management of motorization." All Army maneuvers have bogged down for lack of organization and training in motor movements. Serious defects have appeared in lack of control and dispersion of units.

(22) Reduction in emphasis on motorization—you cannot fight sitting on your bottom.

(23) A special organization for development of anti-tank defensive equal in importance to the motorized divisions.

(24) The long term conduct of "mud tests," "cold tests" and "heat, dust and sand tests" under severest conditions for equipment and men. Find out now what is wrong with equipment before too many of each type are made. The country's mechanization is far from perfect.

(25) The establishment of a G. H. Q. anti-tank force.

(26) The establishment of a G. H. Q. anti-aircraft force.

(27) Reorganization of the Army field commands.

The Gillette Abrasive Stone

By DAVID H. HARRIS

Gillette Safety Razor Co., Boston

o o o

MEANS of comparing abrasive stones have recently attracted lively interest. In the April 25 issue of THE IRON AGE the maker of Superfinishing machines described a unique procedure of rating abrasive stones by means of readings taken by a Brinell hardness machine. The article herein deals with an entirely different method of comparing stones. The Gillette company believes its procedure has definite advantages and sets forth reasons for this contention. Results obtained by the Gillette method are also detailed. It is hoped that this second article on abrasive stone comparison leads to even more attention directed to this important problem with consequent benefit to industry as a whole. These data were originally reviewed at the M. I. T. conference on friction and surface finish last June.

o o o

THROUGHOUT almost every phase of mechanical industry today the use of abrasive stones is becoming more and more important, and the service required of these stones more exacting. In its infancy the abrasive industry was concerned with the simple problems of development of shape, later with grinding to dimension, and today with closer dimensions, plus a prescribed surface profile or finish.

Progress in any industry is the result of improvement in any or all of the component processes from the standpoint of quality and cost. In the Gillette Company this means essentially an improved precision in development of razor blade edges, which depends directly on a *critical control* of the quality of the abrasive stones producing those edges.

Since the inception of the Gillette company in 1901, it has had to struggle continuously with the abrasive problem. The production of the safety blade edge probably represents the earliest precise use of abrasives for finishing to accurate dimension. Likewise it represents the first and most critical application of abrasive material to produce a low micro-profile without objectionable change in surface structure.

In a sense this industry, pioneered by Gillette, has had to work beyond the frontiers of knowledge in the use of abrasive materials. It is, therefore, quite natural that the company should try to understand more about the stones which are used and be able to discuss the situation in terms of specific data rather than time-worn hypotheses and generalities.

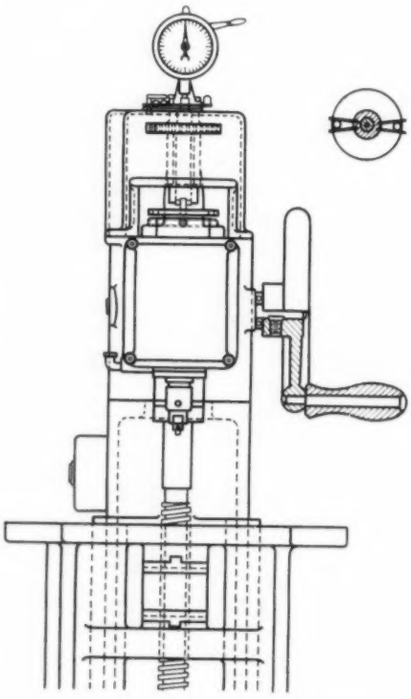


FIG. 2—Front elevation of model D Gillette stone tester.

Lord Kelvin once said in substance that ". . . to measure is to know . . ." The author might say that if wheel quality can be measured, the result will be a common hook on which to hang arguments.

During recent years there has been notable improvement in the art of preparing and bonding abrasives. Today, however, this improvement must be taken for granted. New and more exacting working tolerances on dimension and surface finish can be met only by further refinement in stone structure and performance.

No shop today can afford to neglect the inspection of abrasive stones any more than it can afford to neglect the inspection of other raw materials. Good stones improve quality of product, increase machine utilization, decrease cost of product, etc. Wherever an operator is compelled to adjust stone speed, work speed, pressure, lubricant, etc., frequently, it may be concluded that stone quality needs improvement. The stones which are complete failures are only part of the problem. The "lame ducks" that just get by on the production line involve more excess cost than is generally recognized.

A few years ago the Gillette company decided to examine abrasive stone performance in detail. The examination was twofold—first, measurement of stone quality before use; second, recording of the complete history of the stone in use.

The company has been singularly fortunate when it comes to making interpretable performance records, because razor blade edging occurs on batteries of precisely made machines running continuously on uniform material under accurately controlled conditions. It is, therefore, easy to make comparison of wheel performance records.

The first part of the problem—measurement of stone quality—is more difficult. To begin with, *stone quality* is something which has never been

Comparator . . .

FIG. 1—Early Gillette model for testing abrasive stones.

properly defined. Is it subjective property, i.e., a composite of bond modulus, porosity and grit size, or is it an objective property which must be stated in terms of material to be cut and mode of cutting?

The author would hesitate to define stone quality except objectively in terms of the work to be done. Any instrument designed for the comparison of stones must, therefore, simulate the wearing-out process or the conditions of use. This instrument would not indicate hardness, porosity, etc., but would give a numerical measure of operating disparities.

Interest at Gillette has grown rapidly. Even with the earliest crude stone comparator, Fig. 1, where the diamond drill was rotated by hand; disagreement was found between readings on stones of the same mill grade.

At first it was impossible to separate instrumental or human error from the data. Because of this the power drive and successive improvements in machine design were introduced.

As the testing machine became reliable, it became possible to make duplicable readings accurate to within 10 per cent (overall). New wheel defects became apparent. The test data lined up with the life records. To repeat, "when you measure you know"—when it becomes possible to forward reliable data to the abrasive manufacturer—data which he can duplicate—the situation may be remedied.

The Gillette company is now making a 100 per cent inspection of stones at first every stone was run on the line. Inspection of the results of the first 200 tests indicated which stones were best and which should have been rejected. Under the testing conditions established, it was found that those stones with test penetrations of 0.012 to 0.015 in. were invariably the wheels which gave the least machine shutdown and the longest net life.

The experimentation was further facilitated because of proximity to the source of wheel supply. The company was able to get its story back to the mill and continue with small test batches without too much delay. The mill, by repeated modification of method, improved the wheels so that finally 90 per cent were within the desired tolerances, wheel life had increased over 200 per cent, machine shutdown was markedly reduced, and operator complaint abated.

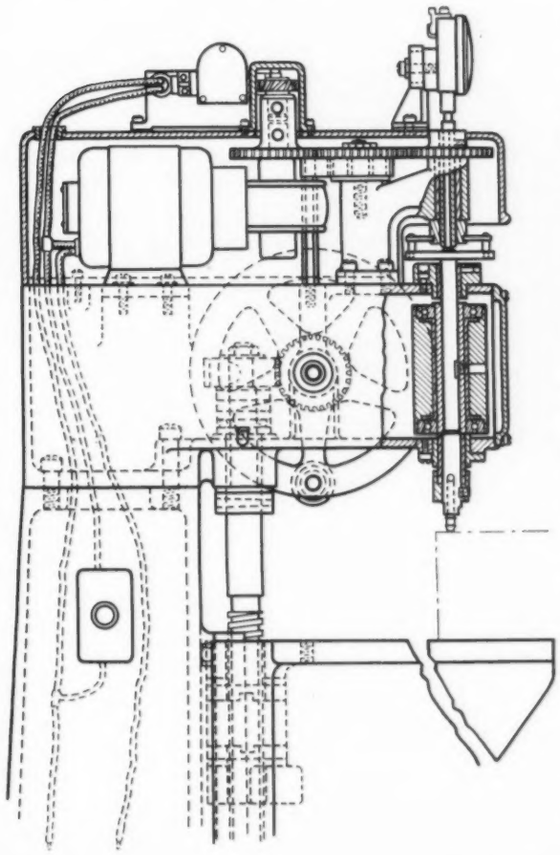


FIG. 3—Side elevation of model D Gillette stone testing machine.

Instrument Design

Fig. 1 shows the early Gillette model and Figs. 2 and 3 the side and front elevations of model D, while Fig. 4 shows the assembly of model D. Models B and C are bench models and will not be described here.

Model D is a floor type suitable for testing stones up to 12x12 in. It has a number of important features, as follows:

(1) *A rapid table adjustment* permitting quick setting of the drill on the stone.

(2) *Accurate alinement of the drill*—without accuracy in this respect the crater may become distorted because of "runout" and the weight of load will not move downward freely.

(3) *Freedom from vibrational errors*—rugged construction and accurate close fitting bearings and a bal-

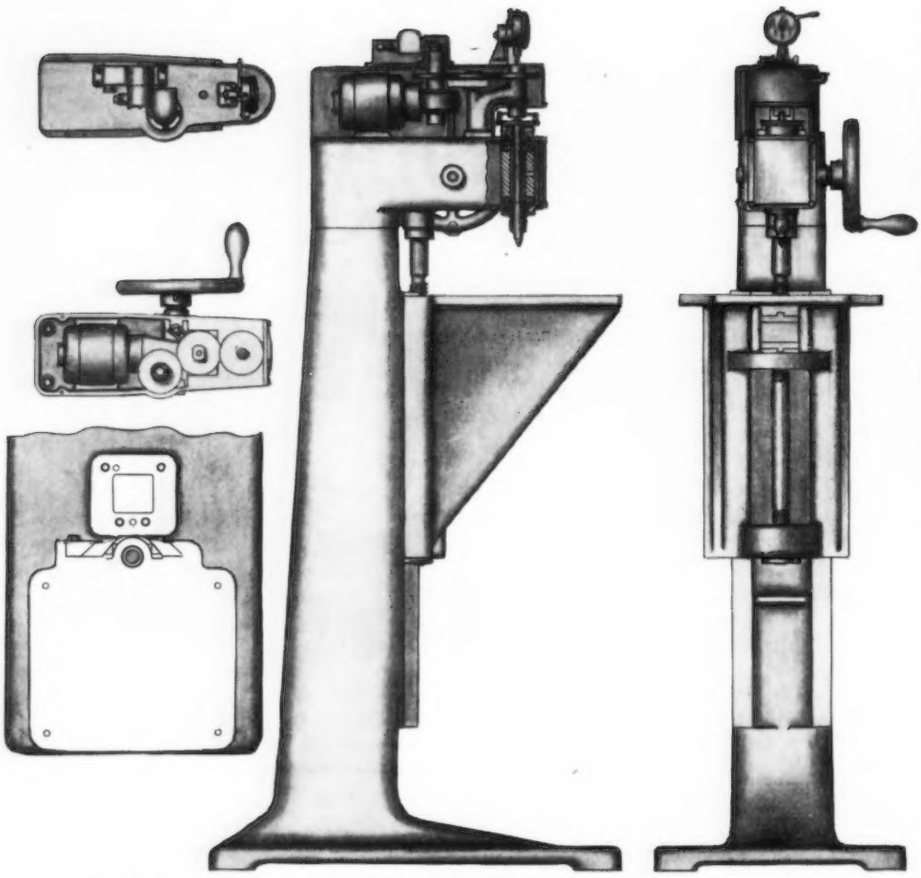


FIG. 4—Assembly of model D Gillette stone hardness tester.

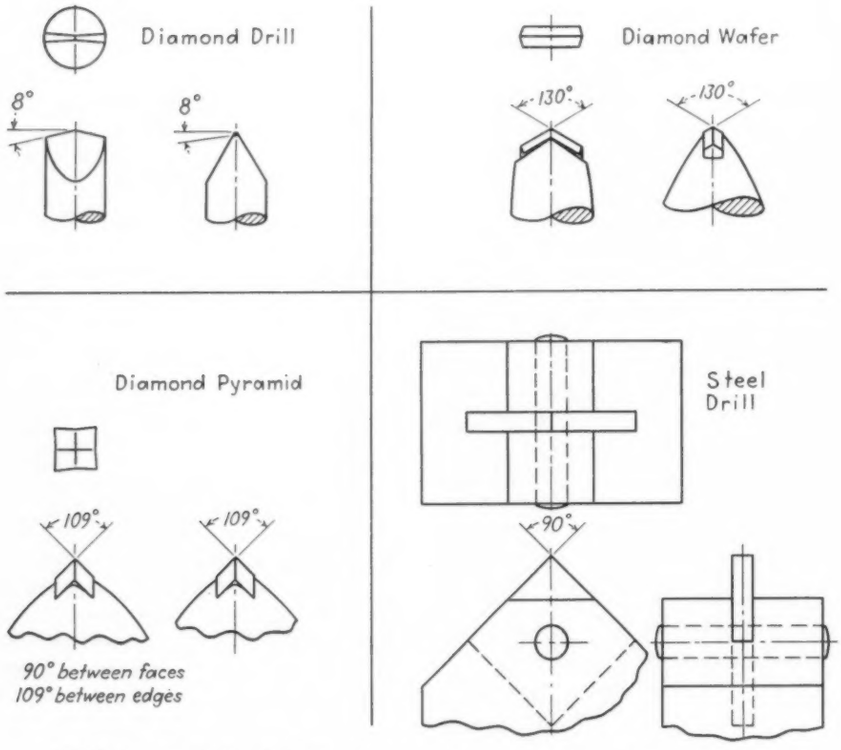


FIG. 5—Drills for Gillette abrasive stone testing machine.

anced motor all serve to remove vibrational error.

(4) *Floating load*—the load assembly is supported only by the stone. By driving through a spring wire which contacts vertical studs, resistance to fall is a minimum. The load can be modified to suit test requirements.

(5) *The instrument is direct reading*—the zero point is set after a dial recoil of two turns.

(6) *The automatic cut-out mechanism*—designed to operate in one of three ways:

(a) It will interrupt rotation of the drill after 15 turns, penetration being read on the dial indicator.

(b) It will interrupt drill rotation at a prescribed depth, and count the number of turns and fractions thereof required to produce this penetration.

(c) It will interrupt rotation of the drill after it has moved between two predetermined levels and count the turns and fractions thereof required to produce this change in penetration.

A brake is applied continuously and stops the motion of the spindle instantly. A reading can be made at once.

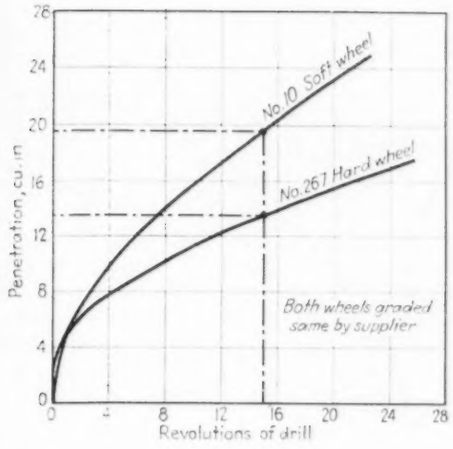
(7) *Free wheeling load*—To avoid the shock incidental to starting and stopping the rotating load suddenly, the weight (or the part with the greatest part of the kinetic energy) is supported on ball races. The brake arrests the spindle motion, but allows the weight to dissipate its energy of rotation in bearing friction without affecting instrument reading.

(8) *The drilling takes place at a uniform speed*—The speed chosen for the instrument is 90 r.p.m. Lower speeds could be used, but would decrease the output of the operator, while higher speeds interfere with crater blow-out.

(9) *Adjustable guide pins and cradles* enable the operator to test similar positions on each stone in a batch.

(10) *A three-point renewable support*—detachable buttons inserted in the table, one point being directly below the drill, prevent rocking and table wear.

(11) *An air blow-off* is provided and directed at the crater. This is an important feature of the instrument. The orifice can be repositioned at will. It is important that compressed air be bled to about 20 lb. pressure and be dry. If no moisture absorption system is available, aluminum oxide de-

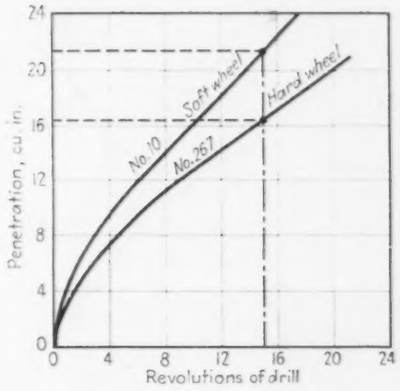


AT LEFT

FIG. 6 — Data from motion picture record of penetration of pyramidal point.

AT RIGHT

FIG. 7 — Data from motion picture record of wafer point penetrations.



hydrating cartridges can be provided for insertion in the air line.

(12) *The drills are accurately made and durable* — The diamonds are mounted in tapered shanks which can be drifted from the spindle. (The spindle fit in its bearing is held to 0.0005 in. and operates with little or no lubricant.)

Drills are faced to better than 0.0001 in. deviation of point from exact center and with all angles to within 30 sec.

Drill Construction

Up to the present time, the company's experience has been limited to drills with four basic designs, as shown in Fig. 5.

(1) The four-sided pyramidal diamond point with 90 deg. angle between faces accurately ground both as regards centrality (0.00005 in.) and angles.

(2) The diamond wafer with 130 deg. base angle and 25 deg. front and back rake on the two lips (included angle 130 deg.).

(3) The chisel point—a special flat drill with 8 deg. back rake.

(4) Several replaceable hardened steel bits.

Of these, only the first two need any discussion here. The pyramidal type has less tendency to drift sidewise in coarse wheel structures and distributes its load over four cutting edges. It is more expensive than the wafer drill. The wafer drill has two supporting edges and therefore penetrates more rapidly than the pyramidal type. This can be adjusted, however, by reducing the load. It was designed as a substitute for the pyramidal type where first cost and maintenance are objectionable.

The chisel or flat drill was developed as a laboratory tool for the study of abnormal conditions. Its penetration is more sensitive to structural differences, but it is not as durable as the other types.

Steel bits were a failure because of rapid wear. Had they proved satisfactory they would have been an inexpensive substitute for diamonds on coarse wheels.

All of the diamond drills were prepared from carefully selected inexpensive stones. The durability of the diamonds is a matter of use and abuse. They will cut from 1500 to 3000 craters in aluminum oxide wheels vitreous or resin bonded without serious wear. The rate of wear decreases as the corners become slightly rounded and for this reason re-dressing can be delayed until the correction amounts to 10 to 15 per cent of the readings. The correction is established by reading a uniform reference stone first with a freshly dressed stand-by diamond and then with the production tool.

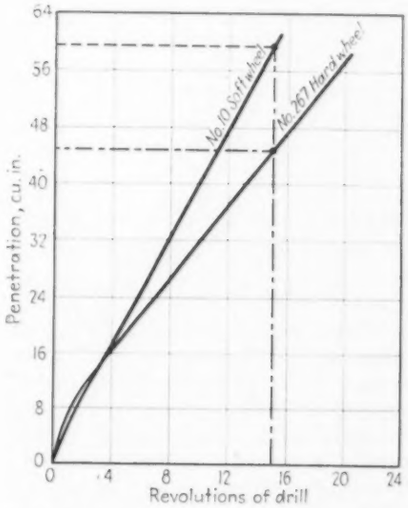


FIG. 8—Data from motion picture record of penetration of drill point.

It is sufficiently accurate to apply the difference in reading to the next 200 test drillings after which a second check should be made against the standard.

Testing Cost

In the production of high quality finish and when working to accurate dimension, it is believed that everyone will agree that labor is the largest item of cost. The prime consideration is to dispatch each job with as little attention to the abrasive stone on the part of the machine operator as possible. This requires the selection of the proper grade of stone, but more particularly the maintenance of stone quality.

Obviously there is no desire to spend as much money in the testing of stones as is saved on the production line through elimination of inferior stones. In a sense the cost of testing is one limiting consideration. If by testing all stones or by testing several points on each stone there is a benefit to be derived, it is to be recommended. The matter of quality of work alone may dictate testing procedure.

At Gillette a practice is made of testing six places on each cylindrical stone—one set of three, consisting of two end readings and a center reading, is alined axially and opposite to the other. *It is extremely important* that testing be accomplished on a surface which has been dressed by a tool or diamond that does not preload the surface, and also important that this dressing be uniform and smooth and that there be no oil or moisture contamination.

The author would like to stress the importance of preparing the stone surface properly, both for reasons of test and because to do so will avoid much of the "break-in" trouble on the production line.

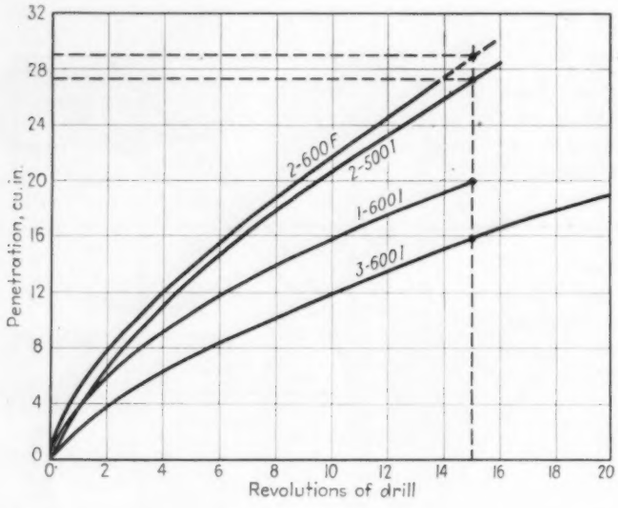


FIG. 9—Penetration of pyramidal point on vitreous stones.

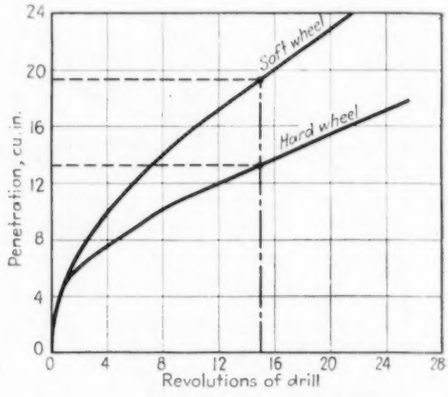


FIG. 10—Crater depths obtained by measurements on separate craters produced with various revolutions of pyramidal point.

End readings on stones are interesting whenever critical analysis is at stake. For routine testing tests should be confined to the surface which is to be used.

It is interesting to note that data on hand indicates that there is a selective hardness on some stones depending on the direction of molding.

Cost of testing then can be controlled, first, by using low cost labor; second, by using as many test spots as seem advisable, and third, by the percentage of wheels tested. For critical work 100 per cent inspection of stones with a minimum of six test craters is indicated.

Beyond this, the laboratory can get additional information by further tests on the rejected stones.

Penetration Mathematics

Theoretically the penetration of the pyramidal diamond point follows the general equation $X = Kt^N$

which in this special case becomes:

$$X = \left[\frac{2\,K\,W\,\mathrm{Cos}\,\theta}{S\,(N+1)}\right]^{\frac{1}{2}} T^{\frac{N+1}{2}}$$

where k = a constant representing the resistance of stone to breakdown.

W = load on drill.

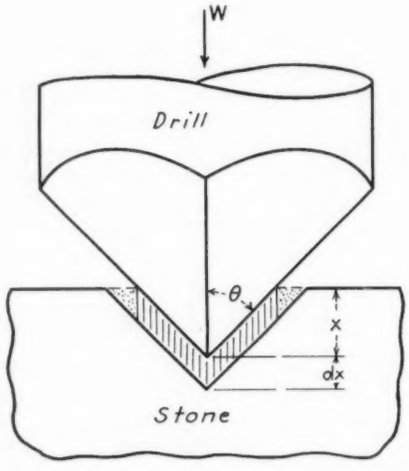
θ = one-half of the angle between corners (not faces) of pyramidal drill.

S = number of edges on drill.

N = constant.

T = number of turns taken to reach depth "X."

Penetration is dependent directly on the factor "k" which is a measure of wheel resistance and on the number of turns "T." Under any particular machine set-up W, S, N and θ are always the same. This equation has no particular significance. The actual test data departs from this relationship for certain mechanical reasons in the early stages of penetration.



Graphical Representation

There are three ways in which stone penetrations can be had. One requires that the penetration be stated in terms of the descent of the diamond produced by a standard rotation (15 turns), a second requires penetration to a predetermined depth and making record of the revolutions of the point necessary to reach this depth, and a third, the penetration between two prescribed depths with record of the revolutions of the point necessary to produce the advance. There is something to be said in favor of each method. The data which we have gathered is based on the first method.

To understand more clearly what is involved in the method adopted, the author analyzed the mode of drill penetration by plotting depth of penetration against number of turns. This analysis can be made in two ways. Either by motion picture analysis as in Figs. 6, 7, 8 where penetration of the point is read from the film on each quarter turn, while the drill is in motion on a single crater, or it can be analyzed by plotting crater depths obtained on separate craters produced with 1, 2, 3, etc., revolutions of the drill. The latter method (Fig. 10) is less accurate because it includes the variations in wheel structure from point to point which cannot be evaluated.

It may be of interest to know that in spite of the aforementioned error, Fig. 10 is essentially the same as Fig. 6 in the case presented. This will not be true on stones which are not uniform.

The motion analysis data falls closely on the curve. These curves demonstrate, for instance, that two wheels which are designated as No. 10 and No. 267, delivered to Gillette with the same mill grading, have entirely different structure. Wheel No. 10 has a hardness 19.6 and No. 267 a value 13.5, using the pyramidal diamond.

A spread of this sort is not uncommon. In fact wheels have been re-

ceived reading as hard as 10 and as soft as 30 from the mills on separate orders but marked the same.

The *wafer* point with the same load gave values 21.4 and 16.4 and the drill point gave values 59 and 45 on stones Nos. 10 and 267, respectively. As said before, these are different tools and should be loaded differently from the pyramid. The comparison is made here under the same load to bring out one point, namely, that these drills are able to separate the wheels in an orderly manner. Percentage-wise the differences are much the same.

Fig. 9 brings out another point in connection with the vitreous bonded stones:

> Stones 1-600-I, 2-500-I and 3-600-I should be in sequence of hardness but are not. The test shows a difference between a stone made under formula 1 and one under formula 3—the grit size and grade being the same.

The maximum deviation of the data from the curves is about 5 per cent and the mean deviation close to zero —deviation being a matter of error in reading rather than instrumental error.

The curves demonstrate that the instrument is dependable and consistent —inconsistency of data being entirely a function of stone structure.

There has been no occasion to use graphic records, except for research work. In general, testing consists in selecting portions of a stone for test which are free from grease, oil or water, placing the stone on the table on the proper stops and bed studs, elevating the table until the drill contacts the stone and the indicator recoils two full turns, adjusting the air jet, starting the motor and standing by until it cuts out after 15 turns.

The penetration is then read, averaged with other points, and corrected for drill wear, if any. The latter values are used to judge the wheel. The author prefers to use this instrument as a comparator and limit its use to the control of quality in a chosen grade.

Stone Discrepancies

It may not be beyond the scope of this paper to mention some of the obvious defects in wheel structure which become apparent. A difference in hardness between the center and ends or edges is invariably found. This variance may take several forms, some of which are understandable: (1) it may occur as streaks of softness, (2) it may involve hard and soft areas, (3) it may progress more or less uniformly from hard end to soft center, (4) or may be stratified, (5) it will usually abate as the inner structure of the stone is uncovered, (6) it may have direction, i.e., show a different hardness if read 90 deg. out of plane.

The above details define stone non-uniformity. The author believes that the abrasive industry is competent to interpret and meet such conditions when they are demonstrated and measured.

One word about the craters. These will be clean except for the traces left by the cutting edges at the instant of stopping. The broken abrasive and bond has been removed and is not forced into the interstices of the stone. This is mentioned here because this instrument operates quite differently from those used in the industry.

It is believed that with an instrument of this type which simulates in part at least the conditions of wheel use, with rapid removal of broken down bond and abrasive, it is possible to learn more about the properties of a stone than can be learned from impact or pressure types of testing equipment. Impact machines have undefinable rebound and dusting problems. Pressure type instruments give readings which are modified not only by *spring-back*, but more especially by the spurious sliding of swarf into the interstices of the stone. An inspection of photographs like those in Fig. 11 will reveal the fact that this sliding takes no uniform path, often undercuts, avoids hard spots and is dependent on stone permeability as distinguished from stone porosity.

The photographs were prepared by sectioning outside the crater and abraiding the cross-section carefully until the crater was exposed. Wherever the under structure was broken, particles dropped out and with oblique illumination produced the photographs shown. The disturbance is more extensive than photographs indicate. The extent of the crushing can also be ascertained by carefully dislodging the

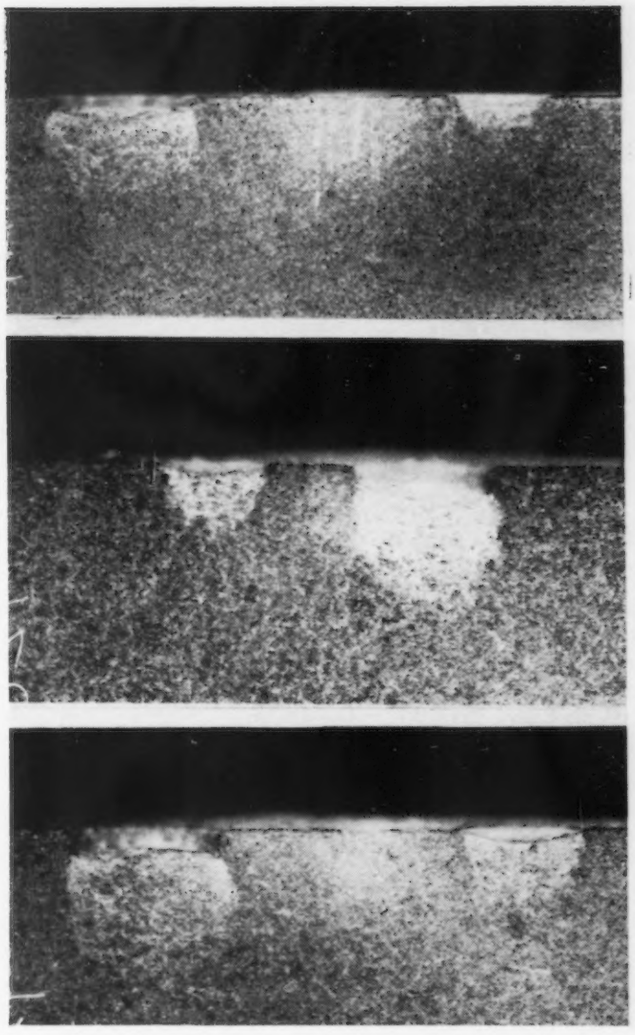


FIG. 11—These photographs show that pressure type instruments often undercut, do not take a uniform path, etc.

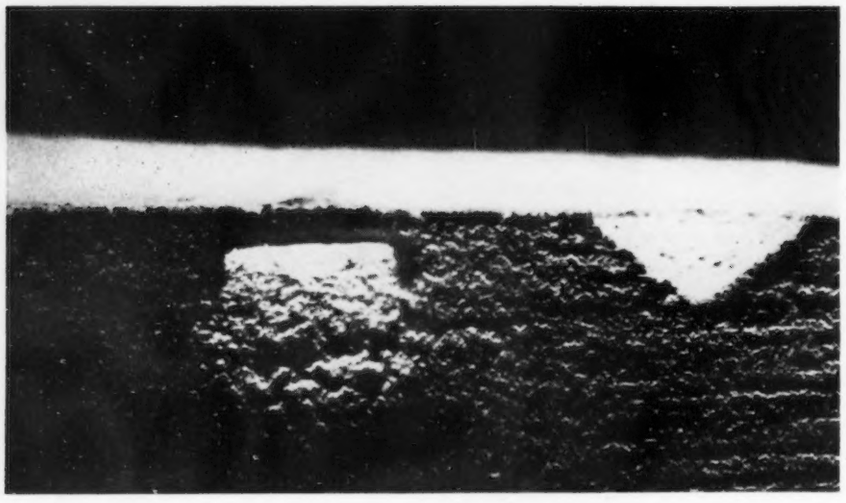


FIG. 12—This illustrates that there is no broken understructure (right) when using the Gillette machine to test vitreous stone.

broken structure from an impression. By careful technique it is possible to discover instances (in vitreous stones) where hard clusters of grains are not dislodged and structure is broken below and around them, proving that swarf flows where resistance is least. Such an irregular flow does not permit accurate grading. The Gillette impression does not have a broken understructure, as demonstrated in Fig. 12.

Conclusion

In contrast to other types the cycle of the Gillette instrument is reproduceable at most any stage. It will give the same order of grade, regardless of whether 10, 12, 15 or 25 revolutions are used.

It operates on a different principle and with refinements which are new. It is free from errors, due to compacting, and develops conical craters which are practically free from dust.

The penetration of the point is affected by several factors such as (1) load, (2) number of revolutions, (3) fragility and size of abrasive, (4) shape of drill, (5) wheel formulation, (6) processing, etc. In testing stones in a particular batch items 1-5 are constant and drill penetration is, therefore, related to errors of processing and particularly to bond strength.

For practical purposes it is enough to be able to classify wheels and let the supply house assume the responsibility for eliminating the irregularities which the comparator uncovers.

Effect of Ladle Additions on the Properties of Cast Iron

IN a recent issue of *Die Giesserei*, E. Piwowarsky contributes to the problem of the effect of ladle additions on the properties of cast iron. (From abstract of the British Iron and Steel Institute.)

After a chronological survey of methods of improving the properties of iron castings by additions of elements or compounds to either the charge in the cupola or the metal in the ladle, the author describes an investigation he undertook with the object of determining the influence of the usual ladle additions such as ferro-silicon, silico-calcium, titanium-silicon and calcium-lithium on the structure of a series of high and low-carbon irons, and in what manner these changes in structure affected the mechanical properties.

The following is a summary of the conclusions reached: (1) There is little to choose between raising the silicon content of a high quality iron refined in an electric furnace by either ladle additions of ferro-silicon and silico-calcium or cupola additions of ferro-silicon; (2) ladle additions to iron produced from pig iron and cast iron scrap have, on the whole, a deoxidizing effect and this seems to produce a denser structure, but this has only a slight effect on the strength properties; (3) the strong graphitizing effect of these ladle additions can be used to keep down the silicon content of this high quality iron and this reduces the influence of the wall thickness on the strength per unit of cross-section; (4) the addition of increasing quantities of steel scrap to the charge has a better effect than ladle additions on the process of carbon pick-up by high quality iron in the cupola; (5) ladle additions have the greatest effect when used with iron containing less than 2.8 per cent of carbon produced from a charge containing a high percentage of steel scrap; (6) ladle additions do not reduce the size of the graphite particles; (7) a reduction in the phosphorus content appears to reduce the size of the graphite; and (8) in making ladle additions, their size and the time at which they are put in are very important, and it is essential that they are immediately immersed beneath the surface of the molten iron.

The All-Basic Open Hearth

By J. H. CHESTERS

Central Research Department, United Steel Companies, Ltd., Sheffield, England

THIS description of the use of basic brick in open hearths is particularly valuable in view of the current interest of American steel makers in such construction. Last week the author described the development of chrome-magnesite brick, covered its use in furnace roofs, and detailed tests used on basic brick. Herein, in conclusion, attention is directed to backing bricks, factors influencing furnace life, etc.

BACKING BRICKS: Bricks used for backing work, e.g., on the outside of a thick back wall, do not require such excellent properties although in general they are of the chrome-magnesite type. (cf. Table II, last week.) Frequently they include a proportion of the fine chrome ore sieved out during the production of the special chrome-magnesite brick. This often results in a lower thermal shock resistance and a lower refractoriness under load.

The replacement of chrome-magnesite brick in certain parts of the furnace by cheaper basic material capable of giving equivalent service, e.g., "non-spall" stable dolomite bricks, may well prove to be an important factor in the coming of the all-basic furnace.

Furnace Life

Most of the early all-basic furnaces in this country (England) had short lives, at least so far as the roof was concerned. They were mostly charged with cold metal and suffered the usual week-end shut-downs. Thus, two of the earlier furnaces had roof lives of only about 300 heats, although driven very little faster than a silica furnace. For a few weeks the roof looked perfect and then a layer of 1 in. to 2 in. in thickness split off, apparently due to some abnormal expansion in the surface. Week-end shut-downs tended to detach these split layers prematurely, and the new surface then absorbed iron oxide, and the process was repeated. With improved technique a life of 700 heats or so became relatively common, while one furnace [name deleted by censor—Ed.] had been in operation for 99 weeks (94 in production) on April 13, 1940, and had then done 1335 casts. All the brickwork of this 55-ton hot metal operating furnace above the slag pocket arches was built of basic material. The chrome-magnesite roof was supported by skewbacks fitted with adjustable coil springs, no other means of suspension being employed. The furnace has averaged 14.2 casts (792 tons) per week and in its best week did 1094 tons or 18 casts. The furnace is fired with producer gas and is extensively water cooled, e.g., at the port nose, the frames and door arches.

As a precautionary measure 50 per cent of the roof ribs were filled in with basic bricks from back and fronts in the center of the roof after 56,500 tons had been made. After 68,800 tons, six roof rings were replaced and a further six after 73,300 tons. This furnace, which has a magnesite hearth, is faster working than a silica furnace and in spite of this fact has done an incredibly good run.

One interesting feature of this and similar furnaces is that the slag pocket material, instead of being a vitrified mass, is very cindery and so refractory that it can be crushed up and used again as basic cement for fettling.

At other plants, all-basic furnaces have been installed with a view to improving output rather than furnace life, and increases of as much as 30 per cent are said to have been obtained without any substantial change in furnace capacity. At the Lancashire Steel Corp.[2], a 50-ton Venturi furnace did 19 casts in its first week and 24 for the four following weeks. After 44 weeks, the furnace had made 774 heats and was still turning out 15 to 16 heats per week. The report of the meeting referred to[2] includes drawings of this furnace and shows the coil springs used to support the

[2] See the "Symposium of Steel Making," British Iron and Steel Institute, May meeting, 1938.

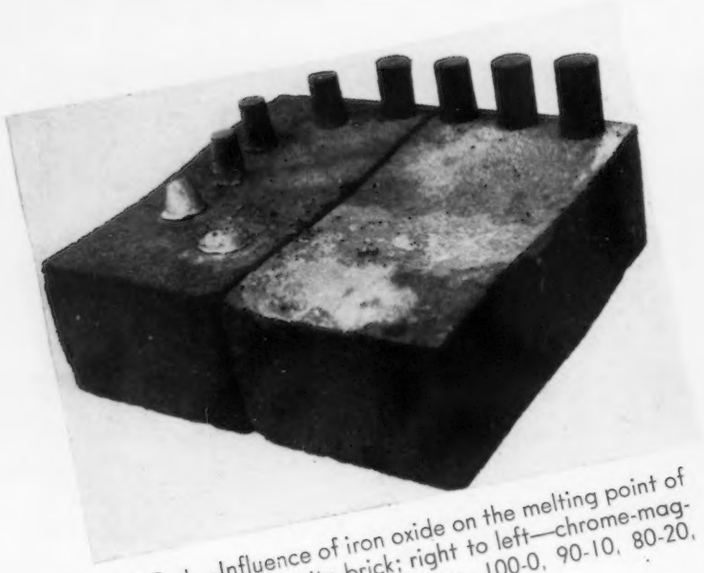


FIG. 1—Influence of iron oxide on the melting point of chrome-magnesite brick; right to left—chrome-magnesite-FeO (equivalent) mixtures, 100-0, 90-10, 80-20, etc.

FIG. 2—Bursting of chrome-magnesite brick in front wall of open hearth furnace; note gap between split surface and remainder of the brickwork (marked, X).

FIG. 3—Chrome-magnesite brick after 11½ weeks in open hearth furnace back wall. Original thickness 9 in.; final thickness, 5½ in.

FIG. 5—Effect of iron oxide on test pieces cut from commercial chrome-magnesite bricks. Note the big difference in bursting tendency of the end samples.

FIG. 4—Magnesite brick after use in the front wall of an open hearth furnace. This type of cracking does not appear to be associated with growth or with changes in thermal expansion.

AT LEFT

roof and also the steel "corset" used to maintain good roof shape. Where such long roof life is obtained, it is clear that cleaning of the checkers will require a shut-down long before the roof fails.

Where a furnace is to be in operation for such long periods, the greatest care must be exercised in bricklaying in order that the durability of the brick is not impaired by some imperfection in construction. The use of header courses rather than alternate header and stretcher courses is found to be useful, while in most installations steel plates are placed between the bricks, both in the roof and in the side walls.

Furnace Life Factors

The resistance of chrome-magnesite brick to iron oxide and lime is so high (Fig. 1) compared with that of silica brick, that an even greater life might be expected than is at present obtained. Unfortunately, chrome-magnesite brick "spalls" long before it fluxes away at all seriously. The mechanism of this spalling has been the subject of much study and it now seems fairly clear that it is due to an expansion caused by solid solution of iron oxide ($FeO.Fe_2O_3$) in the chrome spinel

$$(MgO.Al_2O_3)$$
$$(FeO.Cr_2O_3)$$

There seems to be no limit to the extent of the solid solution and attempts to prevent its occurring by adding mill scale to the brick batch have not been successful. The type of failure obtained is clearly shown in Figs. 2 and 3. The growth on the working face is so great that it can be readily seen without measurement. Thus, spy holes through chrome-magnesite end walls close up quite appreciably in the course of the first few days' service, the 4½-in. dimension of the working face of the brick increasing to about 5 in. in a matter of days. Laboratory tests also show that this expansion occurs while the furnace is at temperature and cannot therefore be just a question of magnesite crystallizing out during cooling. The type of failure is quite distinct from that obtained with magnesite bricks (Fig. 4), the surface layers of which crack off without any appreciable growth having occurred.

FIG. 6—Effect of iron oxide absorption test on laboratory test pieces of varying batch composition. Untested sample included for comparison.

That the amount of this bursting expansion varies greatly with the batch composition is demonstrated by Figs. 5 and 6 which show a series of bursting tests carried out on commercial and laboratory made test pieces. The second test piece from the left in Fig. 5 shows the effect of scale on a chrome-magnesite brick, to which a large mill scale addition had been made during manufacture.

Conclusions

Rapid progress has been made during the last five years in the development of volume-stable chrome-magnesite bricks of high thermal shock resistance and high refractoriness under load. Such bricks still show "bursting" due to solid solution of iron oxide in the chrome ore, but if adequate attention is given to details of design, in particular the springing and suspension of the roof, all-basic furnaces can be built that will operate for long periods. The use of such furnaces will permit of higher working temperatures (and consequently greater output), will reduce shut-down time, lower the slag bulk, and also the amount of fettling material used.

The first installations in England had relatively short lives, but more recently much better results have been obtained, the record furnace having done over 1300 casts. Further improvements in roof design, together with the replacement of some of the chrome-magnesite bricks in all basic furnaces by non-spall dolomite bricks (or other basic bricks of lower price) will hasten the day when this type of construction becomes the rule rather than the exception.

Acknowledgment

In conclusion, the author wishes to thank Dr. Swinden, director of research, the United Steel Companies Ltd., for permission to publish this review; A. Wright, of Stewarts & Lloyds, Ltd.; [name deleted by censor —Ed.]; and W. J. Curtis, of the Parkgate Iron & Steel Co., Ltd., for the photograph shown in Fig. 2.

. . . Tooth Bearings in

IN the second and concluding part of this article, the author shows how the tooth bearings in straight and spiral bevel gears are affected by slight displacements from the correct relative position of pinion and gear, whether intentional or as the result of inaccurate assembly. The material from which this article is abstracted, was originally presented as a paper before the American Gear Manufacturers Association in May.

o o o

TOOTH bearings in gears can hardly be expected to come automatically just as they are desired when it is realized that variations on the tooth surfaces of only from 0.0001 to 0.0003 in. mean the difference between good results and only fair results. The degree of accuracy required is that of very good toolmaking. Generally it can be obtained by cutting, testing, and recutting. After the desired tooth bearing is obtained, the same setup of cutter and machine can then be used to produce any number of duplicate gears.

The gear manufacturer's problem is to produce gears which when mounted in correct position have tooth bearings in the desired position and of desired amount and character. In testing and lapping, it is necessary to run the gears with tooth bearings not only in the central position but also shifted towards the ends of the teeth.

In the most common type of bevel gear testing machine, the shaft angle is fixed at 90 deg. and there are linear adjustments in the direction of each gear axis horizontally, and in the direction perpendicular to the axes vertically. By means of micrometer dials, the gear and pinion can be displaced relatively to each other by known amounts, and the resulting tooth bearings observed. The accompanying illustrations show bevel gears tested with relative displacements in the three principal directions.

When the tooth bearing obtained on test shows that changes in cutting are required, cutters and machine settings can be altered to obtain the desired effects. Straight bevel gears are generated by separate tools for the two sides. The tools are set in the machine so that their straight cutting edges reciprocate in planes which contain the apex of the generating gear. The tool holders allow a slight angular adjustment, so that changes of pressure angle of a few minutes can be obtained with tools of standard angle.

In generating spiral bevel pinions, the two sides of the teeth are finished in separate operations, frequently with separate cutters. It is therefore possible to cut or grind each side of the tooth independently of the other.

Changes in Bevel Gear Generation

Decisions in regard to what changes should be made to improve tooth bearings can be based upon considerations of the imaginary generating gears represented in the generating processes. In general, such changes in the imaginary generating gear consist of changes in the pitch surface, or in the position or curvature of the tooth surface.

Fig. 9 indicates that changes in the diameter or direction of axis of the spiral cutter, constitute changes in the tooth surface of the generating gear, with consequent effects on the tooth surfaces of the pinion generated therefrom. Fig. 10 shows how the same cutter can represent teeth on generating gears of various pitch surfaces. The diagrams in Fig. 11 illustrate how the same cutter can represent a tooth in different relative positions in the generating gear.

Some of the most commonly made changes in the machine settings are outlined below:

To change pressure angle

(a) Tilt tool or cutter in the machine.

(b) Change pitch surfaces of imaginary generating gear and pinion being generated, by using different ratio change gears.

(c) Change distance of back of pinion from center of machine (Fig. 8).

To change spiral angle

(a) Adjust straight tools in sidewise directions, or change distance between center of spiral cutter and center of machine.

(b) Adjust work spindle to a position slightly above or below center.

To change length of tooth bearing

(a) Change cutter diameter.

To change width of tooth bearing

(a) Change pitch angle of generating gear (Fig. 10).

(b) Generate pinion in position slightly above or below center (Fig. 11).

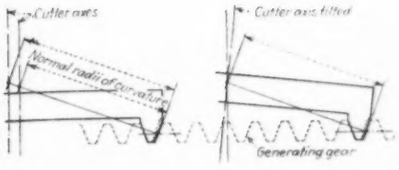
The making of changes and modifications of this kind is part of the technique of spiral bevel gear manufacture, and is explained in instructions for cutting gears and operating machines.

Mounting and Assembling Bevel Gears

Bevel gears are manufactured so as to have the tooth bearings in the proper position when gear and pinion are mounted and assembled according to specifications. There is a certain amount of adjustability which, particularly in the case of curved, spiral

Bevel Gears

By ALLAN H. CANDEE
Gleason Works



CHANGE OF TOOTH SURFACE IN GENERATING GEAR CUTTER DIAMETER AND CUTTER TILT

FIG. 9—By using spiral bevel gear cutters of different diameters (left) and with different directions of their axes (right), changes in the tooth surfaces of the imaginary generating gear can be obtained.

teeth, is fully sufficient to allow for practical tolerances. Backlash, for instance, can be varied by carefully adjusting the distance from cone center to back.

Although accurately controlled dimensions of gear blanks and other parts are relied upon in some instances to assemble gear and pinion in correct relative position, it is always safer to check the actual result by running the gears and observing the tooth bearing. If when the gears are assembled and run, the tooth bearing is found not to be in the proper position, the need for correction is definitely indicated. A knowledge of how tooth bearings act under various relative displacements of pinion and gear, then enables one to make changes in the required direction. A study of photographs showing tooth bearing changes is a helpful introduction to anyone not already familiar with bevel gear practice.

Tooth Bearings in Straight Bevel Gears

Fig. 12 is a series of photographs of a straight bevel gear and pinion, with the tooth bearings caused by various relative displacements. The effect of a slight horizontal displacement in the direction of the pinion axis, in changing pressure angle, has already been referred to in connection with Fig. 8. The accompanying effect of lowering or raising the tooth bearing can be seen in the middle pair of pictures. As might naturally be supposed, straight-tooth gears are not particularly sensitive to displacements in the direction of either axis. They are, however, very sensitive to any displacement in the vertical direction, which causes a misalinement of the

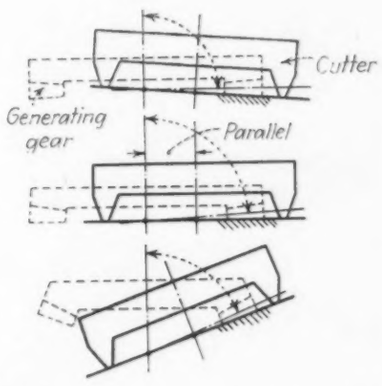


FIG. 10—By changing the angular position in the machine, the same spiral bevel gear cutter can represent a tooth in imaginary generating gears of various pitch angles.

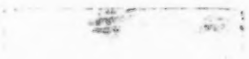


FIG. 11—In spiral bevel gear generation, the tooth surface of the imaginary generating gear is the surface of revolution of the cutter. The relative position of the tooth surface with respect to the axis of the generating gear is altered by shifting the position of the cutter in the machine.

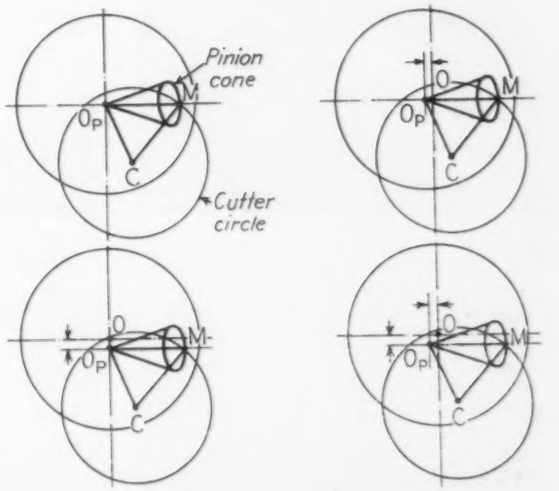
axes and corresponds to a relative change in the lengthwise direction of the teeth, as illustrated in Fig. 6.

Tooth Bearings in Spiral Bevel Gears

In Gleason practice, spiral bevel gears are always cut and finished so as to have a localized tooth bearing, with the contact fading out towards the ends of the teeth. The photographs in Fig. 13 show tooth bearings obtained with various single displacements and also with combined vertical and horizontal displacements from the best setting.

A displacement in the direction of the gear axis does not cause a very rapid change of tooth bearing, and is often used to control the amount of backlash. Sometimes both gear and pinion are displaced axially to change the backlash. Horizontal, out-and-in displacements in the direction of the pinion axis, in general raise or lower the tooth bearing on the tooth profiles, and in curved teeth also cause some accompanying lengthwise change.

Vertical displacements shift tooth bearings away from center and towards the ends of the teeth, in opposite directions on the two sides.



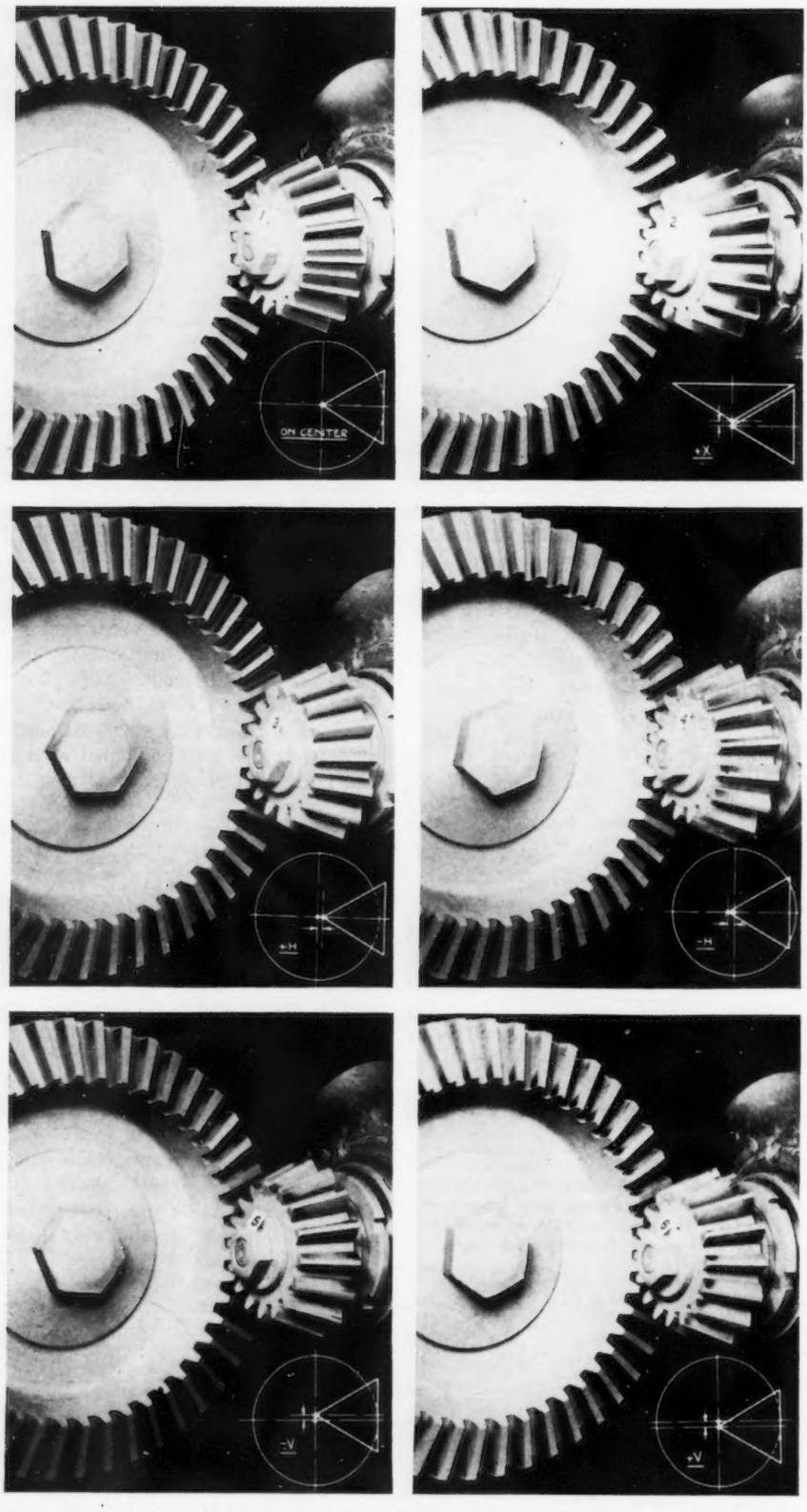


FIG. 12—Tooth bearing displacements in straight bevel gears caused by slight changes from the best running position of pinion and gear: (1) On center; (2) gear out 0.015 in.; (3) pinion out 0.015 in.; (4) pinion in 0.015 in.; (5) pinion up 0.006 in.; and (6) pinion down 0.003 in. These gears are of 4 d.p., 14½ deg. pressure angle, 1½ in. face width and have 16 and 45 teeth respectively.

OPPOSITE PAGE

FIG. 13—Tooth bearing displacements in spiral bevel gears caused by slight changes from the best running position of pinion and gear; (1) On center; (2) pinion out 0.010 in.; (3) pinion in 0.010 in.; (4) pinion up 0.010 in.; (5) pinion down 0.010 in.; (6) gear out 0.015 in.; (7) pinion down 0.005 in. and in 0.005 in.; (8) pinion up 0.015 in. and out 0.015 in. These gears are of 7 d.p., 16 deg. pressure angle, 1 in. face width, 35 deg. spiral angle, 15/45 teeth.

This condition is known as cross bearing, and indicates a relative mismatch of spiral angle. A certain amount of up-and-down shift accompanies the lengthwise change.

When tooth-bearing tests are made during the manufacture of spiral bevel gears, the speeds used should be approximately the same as those at which the gears are to run in service. Also the gear load used for the test can be indicated, if desired, by an ammeter. Then not only the tooth bearings but also the smoothness and quietness of operation can be observed under controlled conditions.

If spiral bevel gears were always tested and run only with tooth bearings in the central position, there would be no direct information about the conditions at the ends of the teeth, where no contact would be seen. It is desirable to lap the ends of the teeth, however, and it is also desirable to have a way of determining the existing difference in curvature between contacting tooth surfaces. Theoretically, of course, tooth spirals with any difference in curvature are tangent at a point. Practically, when any pressure is applied, the contact spreads over a certain area. It is pretty well substantiated by calculation and experience, that under the usual conditions of testing, the amount of separation between the curved surfaces at the boundary of a tooth bearing, is about 0.00025 in. If the tooth bearing length is half the face width, the corresponding separation at the ends of the teeth is then 0.001 in. Of course the same pair of gears will show an increased amount of tooth bearing under heavier load.

V and H Check

A direct indication of the amount of difference in lengthwise curvature is the vertical displacement necessary to change the tooth bearing from one end of the tooth to the other. In order to keep the bearing at the middle of the tooth height, it is necessary to combine a horizontal displacement with the vertical. This kind of a determination is known as the V and H check. It is illustrated in the lower photographs of Fig. 13 and separately in Fig. 14. It has come to be a common practice to manufacture spiral bevel gears to meet a specified V and H check within a tolerance of 0.002 or 0.003 in. This check is not applied to straight bevel gears.

The machines used for cutting and generating spiral bevel gears are universal in their adjustments for the amount of spiral angle. They can be

set to produce curved teeth with zero spiral angle just as easily as 20 or 40 deg. spiral angle. Gears cut with zero spiral angle teeth have only the same amount of endthrust as straight bevel gears, and therefore can be installed with the same design of shafts and bearings. Such gears can be produced with the same generating and grinding equipment that is used for spiral bevel gears. They were mentioned as a new development in gearing in a talk given at the fall meeting of the American Gear Manufacturers Association in 1936. This paper was published in THE IRON AGE, Nov. 12, 1936, under the title, "Recent Developments in Bevel and Hypoid Gearing." Since that time their use has been continually growing and they have been trade-marked under the name Zerol.

Tooth Bearings in Zerol Bevel Gears

These Zerol bevel gears represent a sort of intermediate case between straight bevels and spiral bevels. They are naturally cut with localized tooth bearings similar to those in spiral bevel gears. Observation of the tooth bearings in Zerol bevel gears, shows that they have the advantage of difference in curvature lengthwise of the teeth. They lack the advantages of oblique teeth, however, as regards greater strength and smoothness of running, and do not have as much adjustability to relative displacement as spiral bevel gears of corresponding size and proportions.

Tooth Bearings in Hypoid Gears

The methods of control of tooth bearing described, were developed along parallel lines for both spiral bevel and hypoid gears. Hypoid gears, in fact, represent the general case, because:

(a) their axes may be offset by various amounts, and may be at right angles or oblique;

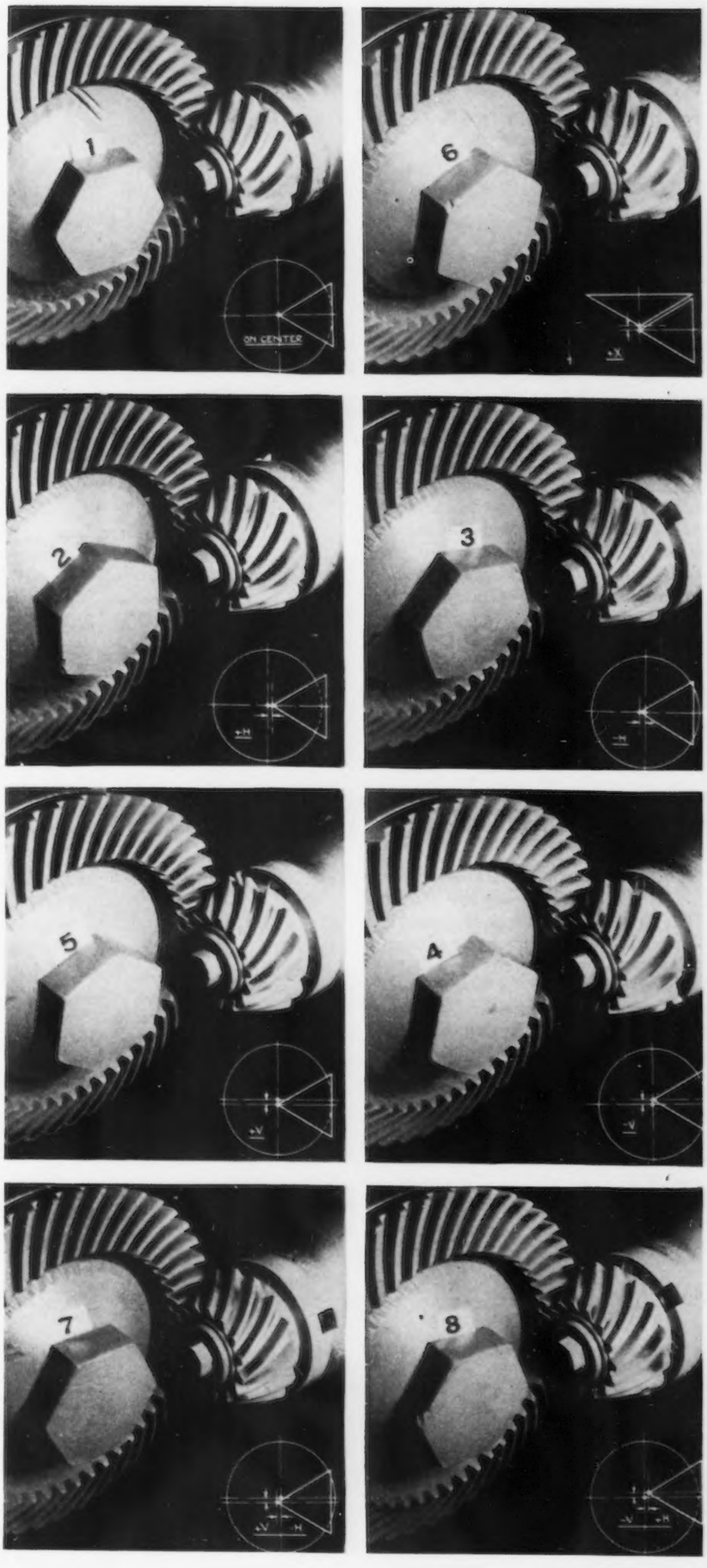
(b) their tooth surfaces may be plane or curved, oblique (spiral) or not oblique.

Spiral bevel gears belong in the same general group, but represent the special case, with the offset decreased to zero.

The effect on tooth bearing of slight relative changes in position between pinion and gear is in general the same in hypoid gears as in spiral bevel gears. (The illustrations of hypoid gears given with the original paper are therefore omitted here — Editor.)

Responsibility of User

The gear manufacturer can produce finished gears which have proper



tooth bearings and operate smoothly and quietly, when run in the specified relative position. It is the user's responsibility to mount and run gears in correct position, and to confirm this by the tooth bearings when the gears are assembled. If this is not done, all the care taken by the manufacturer may be wasted.

After a spiral bevel gear and pinion have been carefully lapped together and are seen to have a proper tooth bearing in the final running test, certain markings are etched on the outer ends of the teeth. Besides a serial number for identification, these markings include the correct mounting distance and the correct amount of backlash. And as a further precaution, for proper installation by the user, tags are attached to the finished gears which indicate that correctness of assembly is to be checked by observation of the tooth bearing, upon which the satisfactory performance of gears always depends.

o o o

FIG. 14—It is common practice to manufacture spiral bevel gears to meet a specified V and H check within a tolerance of 0.002 to 0.003 in.

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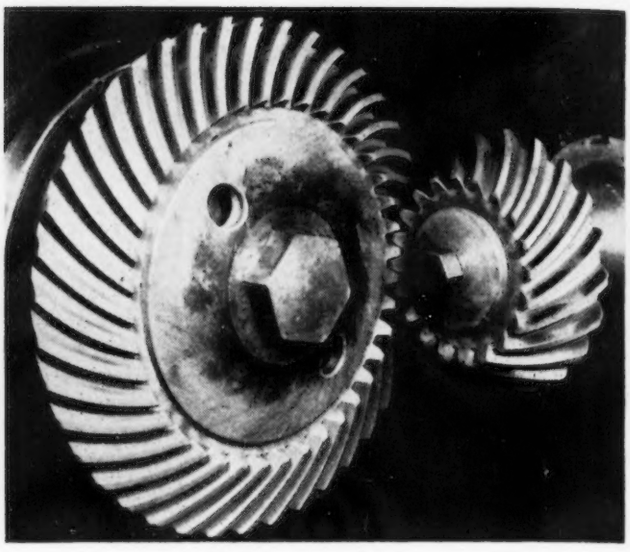


"V AND H CHECK"

SPIRAL BEVEL GEARS, HARDENED AND LAPPED

20/40 TEETH, 4 D.P., 1¼ IN. FACE WIDTH, 16 DEG. PRESSURE ANGLE, 35 DEG. SPIRAL ANGLE

TOOTH BEARINGS MARKED AT ENDS OF TEETH BY RUNNING IN TWO POSITIONS

DISPLACEMENTS	AT INNER ENDS		AT OUTER ENDS		TOTAL
VERTICAL	DOWN	0.003	UP	0.015	0.018
HORIZONTAL	IN	0.003	OUT	0.015	0.018

Removing Water from Compressed Air

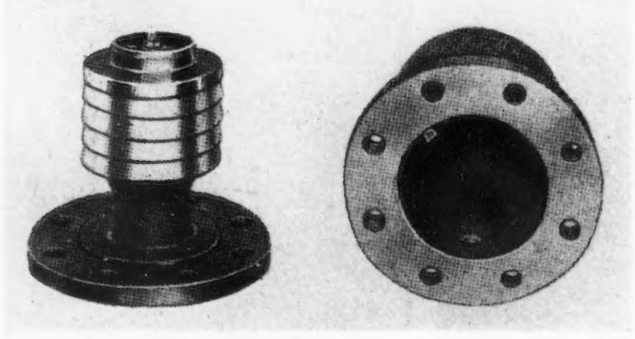
THE adverse effect of water upon the efficiency of a compressed air system is generally appreciated. The Victor Aridifier illustrated, manufactured by Charles Crofton & Co., Ltd., of Wallsend-on-Tyne, England, consists of a series of four rotors. These are mounted on stainless steel ball bearings, the rotors having inclined vanes which are set clockwise and anti-clockwise on each alternate rotor. A single nut fastens all the rotors and bearings in their running position on the spindle, the whole being inclosed in a rugged casing having an inlet at the lower end and an outlet at the upper end.

The giving of an opposite direction to the rotation of each alternate rotor effectively prevents the air stream developing a whirling action. In its passage through the apparatus water, oil or other foreign matter carried by the air, impinges against the rapidly revolving rotors, is thrown outwards by centrifugal force, and runs down the inner walls of the casing and away to the trap.

The cross-sectional area of all points through the Aridifier is greater than that of the air pipe. The pressure drop is considerably less than 1/60 lb. per sq. in., and the running cost is trifling. The apparatus is readily accessible, as the upper casing is removable without disturbing the rotor assembly as shown in the figure. A unit for a 3-in. main is only 12¾ in. diameter and 9 in. overall height.

The Aridifier is mounted in a vertical position with the entry at the lower end. In many of its applications the pipe to the entry is the lowest part of the system, or at least it is the lowest point in the immediate neighborhood. When the system is closed down this point obviously becomes a sump for all condensation in the neighborhood.

On the question of efficiency the extract of a report from King's College, Newcastle-upon-Tyne, is as follows: "Aridifier interposed between air supply and piston drill. Water of known quantity was pumped into air pipe as mist at point 6 ft. before Aridifier and drainage from Aridifier collected and weighed. Free air used per minute, 50 cu. ft.; water injected, 2 lb. 11 oz.; water collected as drainage, 2 lb. 11 oz."



o o o

THE Aridifier with cover removed.

o o o

REVERE INDUSTRIAL EXTRUDED SHAPES OFFER THESE TIME-SAVING ADVANTAGES:

WIDE VARIETY—the extrusion process produces cross-sections of unusual forms with wide variety of slots, grooves, contours and angles. These forms, when cut in suitable lengths, can in many cases take the place of simple forgings, sand or die castings, at a considerable saving in time, tool cost, metal cost and finishing cost.

FEWER OPERATIONS—and a shorter time per operation are required with Revere Industrial Extruded Shapes. In fact, milling or machining operations needed with stock rods are reduced because Revere Extruded Shapes are made in the desired profile.

FASTER MACHINING—is possible, due to the free-turning qualities and absence of grit and chilled areas common in castings, which dull tools, increase scrap and necessitate rejections. Considerable reductions in machining costs are the rule.

LESS WEIGHT—the great strength and non-porosity of Revere Industrial Extruded Shapes often permits reduction in weight. In addition, these shapes can be held to close and uniform tolerances, reducing scrap and finishing costs to a minimum.

America has a re-armament program designed to make us invincible. It calls for vast quantities of tens of thousands of different products. In these different products will be thousands of irregularly shaped copper, copper alloy or aluminum parts.

Instead of becoming a "bottle-neck"—these irregularly shaped parts can become a *time-saving step.*

When speed is vital as it is now—much time and frequently much money can be saved by investigating Revere Industrial Extruded Shapes, Revere Die Pressed or Hammered Forgings and other Revere products.

Over the years we have found many different ways to get rid of "bottle-necks"—to save time, labor, material and costs. To industries now busy with re-armament needs, this service is available at no charge or obligation. Simply write to Revere Copper and Brass Incorporated, 230 Park Avenue, New York. Sales offices and distributors in most of America's major cities.

★

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On The Assembly Line

BY W. F. SHERMAN
Detroit Editor

• Assembly line itself is changed as Plymouth eliminates "body drop" . . . Buick lifts compression ratio of its engines, increases economy . . . Automotive leaders forecast production gains in 1941 . . . UAW on $1,000,000 annual budget

DETROIT — New models off the assembly line each year bring with them revelations of new equipment and new manufacturing techniques, but seldom does any one make any vital changes in the assembly line itself—that is, no one did until last Thursday when Dan S. Eddins, president of Plymouth, showed a new line of 1941 model cars and at the same time revealed that they had come off a new kind of assembly line—one from which the familiar "body drop" has gone.

The body drop will be recalled by all who have visited an automobile plant as the special overhead crane that carefully hoists an auto body into the air alongside the chassis assembly line, then lowers it in place to be bolted to the frame. From this point, the body and chassis travel together down the assembly line while sheet metal parts, fenders, bumpers and accessories are mounted on the car.

However, sheet metal assembly under such conditions has proved to be an inaccurate job—the assembly line worker sometimes had to tug and pull, push and !!! to get an obstinate fender or radiator grille into place. Work was slowed down, and resulting poor fits were usually blamed on the stamping plant or the diemakers.

Assembly of sheet metal parts, fenders, etc., to the auto bodies in rigid fixtures was the answer, Plymouth engineers decided, so they tooled up for such an assembly method this year. Now the body is set in a jig, suspended from two overhead conveyor rails; body, fenders, radiator grille, hood panels and all sheet metal parts are assembled as the conveyor moves, so a single rigid unit reaches the chassis line, instead of body, plus separate parts. Two such body lines have been installed, and one swings over each of the chassis lines, dips down close to the chassis frame, and automatically deposits a body on the chassis below. An original double track system is used for the overhead conveyor equipped with trigger switches which lower the rear end of the body in exact position over dowels on the frame. Workmen then put in anchor bolts and the rest of the unit swings down for permanent assembly on the chassis.

New Method Is a Time Saver

THE new assembly method results in better fits of metal parts, is a time saver, and results in a more solid superstructure, production men assert. There is less damage to anti-squeak materials (used between stamped parts on assembly) and an all-around better assembly job results.

A whole group of new models was revealed last week for the first time when press previews were staged by Buick, Hudson, Plymouth and Willys. Factory executives in most instances have restricted publicity on the new models to generalized stories devoid of design detail. However, some things have already been said about the dual carburetion on Buick, which is really more than that, as is indicated by the term "compound carburetion" which will be applied to it. Also, as stated earlier, Buick has increased the compression ratio of its engines, upped the power, and increased the economy of performance.

The new engine is an improvement on the "dynaflash" combustion chamber design, and the greater performance of the power-plant has won it the official name "Fireball Eight." The valve-in-head design, which normally is rated about 10 per cent more efficient than L-head engines, has been redesigned to give 18 per cent more power and 12 per cent more economy than Buick engines developed last year. An indication of the increased gasoline economy is the fact that the largest Buick engine, 165 h.p., will deliver as many miles per gallon at cruising speed of 40 m.p.h. as was obtained last year from the 107 h.p. engine in the smallest Buick.

A hint, hardly more than that, of the trend in streamlining is given in the single photograph which Buick has released for publication. (See page 50.) The "fast back" type of styling has been adopted and Buick this year will term its body lines "mass streamed." Pontiac, incidentally, is expected to retain the proprietary interest to the name Torpedo which last year was applied principally to Pontiac, Buick and Olds.

Automobile Makers Announcements Bullish

BUSINESS generally can take a lot of encouragement from the bullish tone revealed in automobile manufacturers' announcements for the forthcoming year. The automotive optimism is being backed up by extensive plans for building more automobiles in the 1941 series than have been built in the entire 1940 model year. Buick's Harlow H. Curtice, who has established the practice of setting yearly quotas which prove to be minimums rather than optimistic maximums, has scheduled the Buick division of General Motors to build a minimum of 300,000 automobiles during the 1941 model year. He announced that 283,204 cars were built in the 1940 model year, a new production high for Buick by more than 33,000 cars. Buick has been getting about 9 per cent of the

industry's retail sales and its expectation is that in the forthcoming year it will sell 10 per cent of the anticipated automotive market total of 3,500,000 cars. This expectation of a possible 350,000 Buicks (not the quota of 300,000) would tax even the expanded capacities of Buick plants.

The optimism for 1941 was expressed also during the week by A. vanDerZee, vice-president of Chrysler Corp., who declared at the Plymouth preview, "There is going to be a lot of money spent here in the next twelve months and this money will get into circulation. Taxes will be higher and in the long run this may cause some change in the buying of luxuries, but what we have ahead of us is accelerated business." Plymouth's president, Mr. Eddins, added: "This industry's business prospects for the coming year are indicated by the fact that Chrysler Corp. alone is spending $15,000,000 on new tools, dies and fixtures to improve the 1941 products and the methods of making them."

UAW Seeks War Chest

A war chest of $200,000, to be used by the United Automobile Workers Union for pressing the organization of the Ford Motor Co. workers and to extend union organization efforts among aircraft and other non-union workers, will be sought shortly.

Assessment of $1.00 per member for these purposes was voted down at a closed executive session at the recent UAW convention in St. Louis, as was an earlier proposal of a 50-cent assessment against each member. However, a referendum vote ordered at the convention will be staged prior to October 1.

The UAW, which operates on a $1,000,000-a-year basis, according to recent official figures, is now scheduled to get 40c. from each member monthly instead of the 37.5c. which formerly went into the International Union from each member's $1.00 dues. The increase in the per capita levy will add about $5,000 a month to the International treasury.

Regardless of the referendum regarding the assessment, five separate organizing drives have been ordered including the Ford campaign, aircraft industry, so-called competitive shops in the automotive parts and machine industry

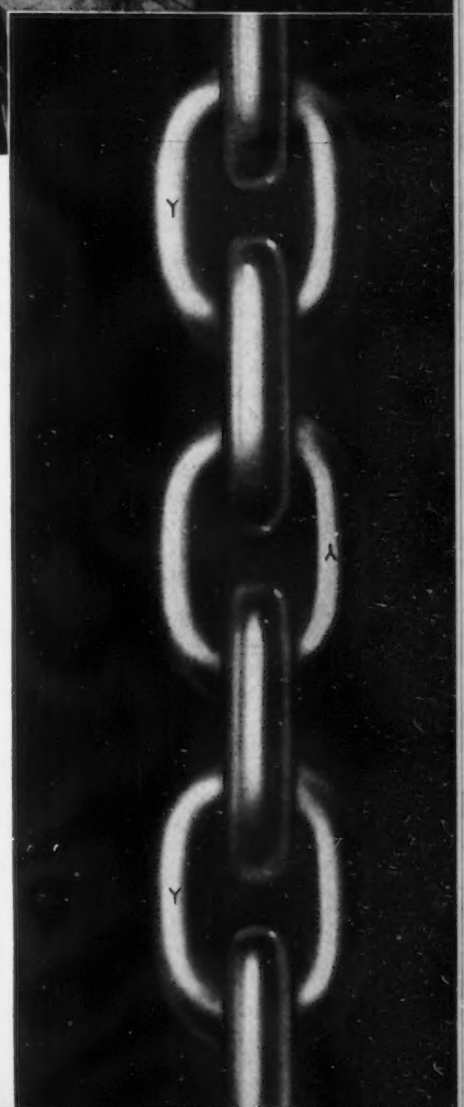
NEW EXCLUSIVE PROCESS INCREASES RUST RESISTANCE—MINIMIZES FRICTIONAL WEAR ON ALL YALE CHAIN

The world's best chain is now better! A new secret plating process developed by Yale makes it so.

Corresponding in a general way to the cadmium plating common to the automobile industry, the secret of this process lies in the final dehydrogenation. Yale has perfected a means of performing this final step in a way which maintains the physical and chemical properties of the steel.

Chain treated with this process—*and only such chain*—has an impervious finish so satin smooth that frictional wear is reduced to a new minimum. This means less operating effort. As for rust—Yale's new coating makes it practically impossible!

Ask your distributor to show you secret processed Yale Chain. It's the latest hoist advance!



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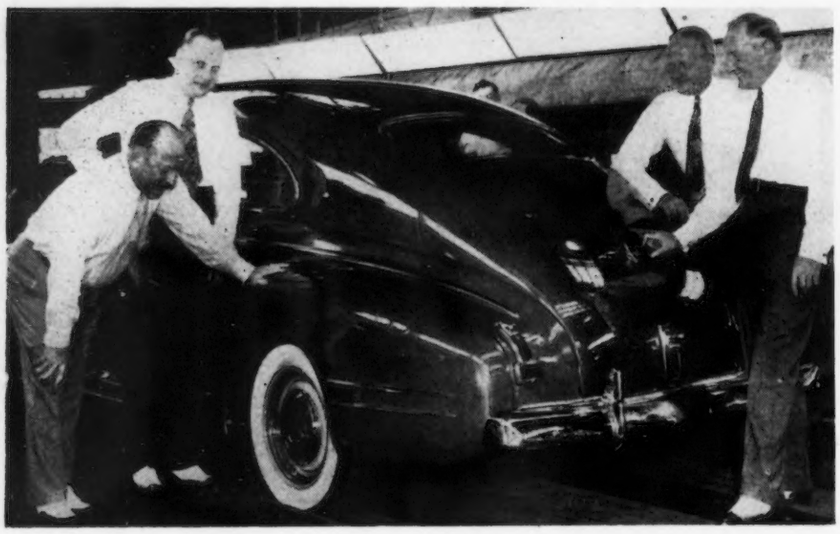
PHILADELPHIA DIVISION, PHILADELPHIA, PA., U. S. A.
IN CANADA: ST. CATHARINES, ONT.

YALE

Makers of Yale Hand Chain Hoists, Electric Hoists, Electrical Industrial Trucks, Hand Lift Trucks and Skid Platforms.



A MASS-STREAMED BUICK, with fast toboggan slide rear end, lead the start of production of 1941 Buicks. No production car up to now has had such an extremely long "tail" as this new body style which will be introduced by Buick early in September. Inspecting the car are O. W. Young, general manufacturing manager, W. F. Hufstader, general sales manager, C. A. Chayne, chief engineer, and Harlow H. Curtice, president of Buick.

and a special drive aimed at the Chicago industrial area.

Auto Tax Diversion Fought

Diversion of automobile taxes from road construction and improvement funds to meet other state demands must cease, if highways are to be provided and maintained for mechanized national defense units, Thomas P. Henry, president of the American Automobile Association, declares.

"Thousands of miles of strategic highways of the nation now fall far short of the requisites for national defense programs, largely because of the misuse of motor tax revenues by the states over a long period of years," Henry declared. "Nearly one million dollars have been sidetracked by the states from highway construction and maintenance funds during the past 10 years. We find that an enormous amount of work must be done on the 80,000 miles in the strategic system of highways to bring this mileage up to the requirements of mechanized military establishment. Thousands of bridges must be torn down and reconstructed.

Anticipatory of possible difficulty in obtaining delivery of large, thin, sheets of aluminum which are used in constructing lightweight bus bodies, Greyhound Corp., interstate passenger bus operator, has placed an order with Yellow Truck & Coach Mfg. Co., a General Motors division at Pontiac, Mich., for 350 busses for 1941 delivery. The fleet will cost $7,000,000. A similar order for 1940 "supercoaches" is now being completed at Pontiac.

Assembly Line for Busses

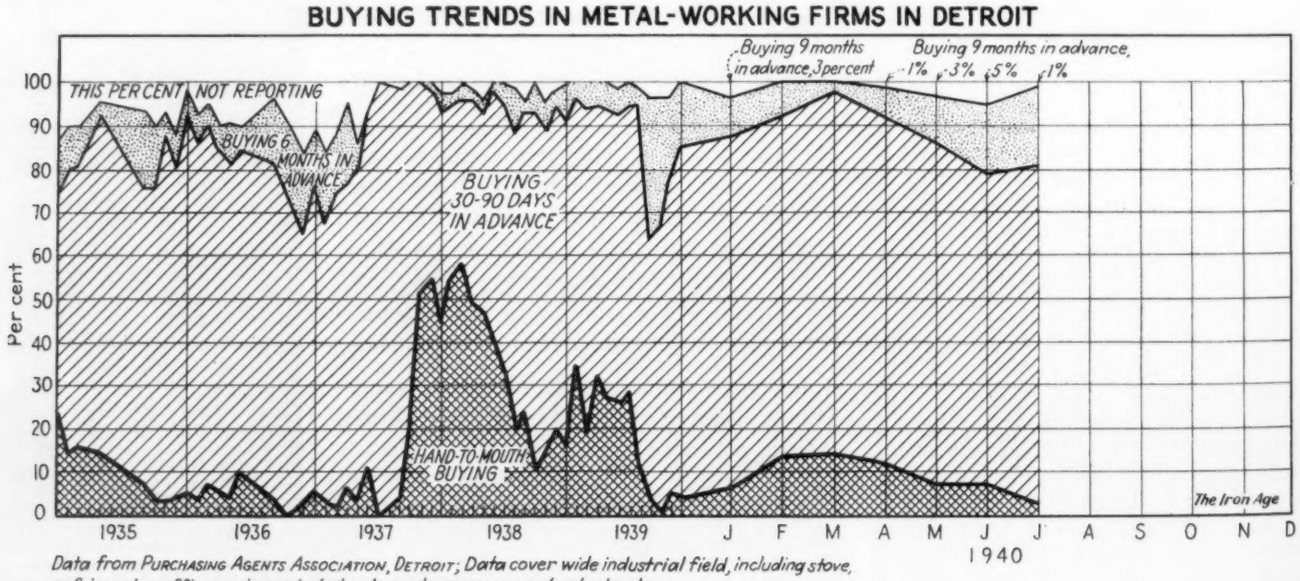
Yellow Truck is to set up an assembly line for Greyhound busses. It will turn out two or three busses a day on a five-day week.

Successful examples of Briggs and Murray in the manufacture of plumbing ware, bathtubs, kitchen cabinets, etc., may be followed by one of the independent automobile manufacturers which is at present investigating possibility of manufacturing some household equipment in its stamping plant.

Negotiations looking toward this eventuality are still in the earliest stages and it is understood that inquiries made for some special materials were merely to obtain information upon which plans could be laid.

Automobile production is sharply on the upswing with output of complete cars resumed by Plymouth, the first of the big volume producers to start its assembly lines. The total for the last week was 20,475 cars and trucks compared with 11,635 a week ago and 15,105 in the corresponding week last year, according to Ward's automotive reports.

BUYING TRENDS IN METAL-WORKING FIRMS IN DETROIT



Data from Purchasing Agents Association, Detroit; Data cover wide industrial field, including stove, refrigerator, office equipment, steel, auto parts, accessory, auto plants, etc.

Uncork the Bottlenecks in producing *Stainless* parts

TROUBLE in machining Stainless Steel can hold up production elsewhere in the plant, tie up much needed equipment and lower the general level of output.

Fortunately, machining troubles can be avoided and production can be made to flow more smoothly by using Carpenter Free-Machining Stainless Steels. They make possible faster cutting speeds, are easier on tools and help to avoid galling.

RELATIVE MACHINABILITY OF STAINLESS STEELS

Type of Stainless	Machines about like:
410	SAE 3140, 4140, 6140, etc.
420	SAE 3150, 4650, 6150, etc.
302, 304	Wrought Iron—only harder
430	SAE 3140, 4140, 6140, etc.
Carpenter No. 5	SAE 1120
Carpenter No. 8	SAE 3120, 4615, etc.

It is only natural that the company which invented Free-Machining Stainless Steel should have gathered a great deal of data on how to machine, grind and polish *all* grades of Stainless Steel. The Carpenter representative is the man who can make this data available to you quickly. He is prepared to help you cure chronic headaches on old jobs and may save you hours of research on new stainless problems. Call him in this week.

THE CARPENTER STEEL CO. - - Reading, Pa.

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BRANCHES AT Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

Washington

BY L. W. MOFFETT
Washington Editor

• Federal price-fixing still seen as potentiality rather than probability . . . Delay in defense program laid to government rather than to industry . . . Washington considered "satisfied" with present price of steel, pig iron

WASHINGTON — Price fixing due to the rearmament program at this time is only a potentiality rather than a probability. For one thing there have been no rises such as would create concern. Apparently there is no prospect of general, if any, increase, barring boosts in labor or other costs though the usual fluctuations and adjustments in the price structure of some commodities naturally are to be expected. Also industry has successfully made a studied effort to avoid responsible recriminations charging that it is attempting to cash in on the national defense program.

It is an interesting and unusual fact that little or nothing is heard even from political business baiters about war profiteers, or about the so-called sins of "munitions makers." Rather, the complaint takes on a reverse form, for criticism now and then is heard about the reluctance of manufacturers to take war business, which it is realized is distasteful in itself and is upsetting to commercial operations, but also is not profitable. Earnings that may look intriguing, it is recognized, are largely paper profits inasmuch as taxes will eat them away to a point where they will be almost negligible.

Obviously industry stands ready to cooperate and is cooperating to the fullest extent possible with the government in the national defense program. The lag that is attendant upon the program is due to delay in government functions rather than failure of industry to respond to its obligations. An outstanding example is the piddling in Congress over pushing through an amortization plan to cover expansion of facilities for producing defense requirements.

Prices Are Watched Constantly

AS has been pointed out in THE IRON AGE, Leon Henderson, head of the National Defense Advisory Commission's price stabilization, has said that the domestic price structure is under constant surveillance and that numerous proposals for price regulation are being studied. A Central Bureau of Research has been organized under the direction of Stacy May as a clearing house for information. Indicative, however, of the behavior of the price structure and of the fact that price fixing is not an early prospect is the statement of Mr. Henderson that there is no need for government price fixing at present and none will be needed for any commodity if supplies are kept adequate and if new facilities are built when needed. He did point out at the same time that the commission is doing everything that it can short of outright price control to keep prices of raw materials used by the steel industry from rising unduly. In this connection he said the export licensing restriction on No. 1 heavy melting scrap is a factor guarding against price rises, and suggested the probability of other grades of scrap being subjected to export restriction. It is quite conceivable that Mr. Henderson had in mind the fact the greater portion of scrap exported is other than No. 1 heavy melting scrap.

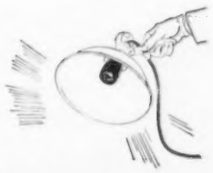
It is said to be the view of Washington national defense sources that the behavior of the scrap market does not call for any early move toward price fixing. Supplementary to this view is the belief that if scrap prices are fixed it is a strong likelihood if not a virtual assurance that pig iron and steel prices also will be fixed and indeed that the entire commodity market will be subjected to a system of price regimentation.

Concerning the price situation with regard to scrap, pig iron and steel, it is pointed out that a group of existing factors not present for the most part during the World War are opposing a runaway market trend. These influences in themselves, it is held, might be sufficient to offset the necessity of formal governmental control.

Supply-Demand Still Governs Scrap

SCRAP prices manifestly continue to be governed by supply and demand. However, there have been injected during the past several years new elements which have tended toward a more stabilized price structure without the violent fluctuations that led to price fixing during the World War. For instance, in recent years some large steel companies have practically become independent of open market heavy melting scrap supplies. This position was achieved by a definite plan of synthetic scrap manufacture—that is, by blowing hot metal in the bessemer converter and subsequently pouring the charge into proper sized molds precedent to use in the open hearth furnace.

As steel ingot production increases the amount of steel made by the duplex method—molten pig iron blown in the bessemer converter and then taken to the open hearth for final processing is also stepped up. This condition is pointed out because many authorities seemingly use total ingot production as an indicator of the scrap melt. But as a matter of fact it is contended that a sharp rise in duplex steelmaking would increase the error in estimating scrap consumption since this method does involve the use of old material.



BLACK LIGHT BAGS CROOKS

Clever forgeries detected by new development of G-E research

1 THE POLICE WERE SURE the check had been tampered with. But it showed no signs of alteration . . . until it was exposed to the invisible "black light" of a special G-E lamp. Under its searching ultra-violet rays, the original name glowed faintly . . . and another clever forger was brought to justice.

2 THE SECRET is that alterations frequently show a different fluorescent character than the original under ultra-violet rays. As a result this lamp has many practical uses. Laundries using black light can mark shirts with invisible ink. One laundry (above) washed 14,000 shirts in a week without error. Is there a place in your business for this "black light"?

3 THE STREAMLINED LIGHTING in this new deluxe Pullman lounge car now serving the New York Central is good functional design because the lamps are the new G-E MAZDA "F" lamps. Ask your G-E lamp man or your electric service company about these fluorescent tubes that provide new high levels of illumination for business and industry.

4 SQUEEZE EXTRA LIGHT FROM A 100 WATT BULB? G-E research is doing it all the time! By improving the filament. By purifying the argon gas inside. And by other improvements in manufacture which make today's 100 watt G-E MAZDA lamp give nearly 50% more light, cost 86% less than same size in 1921. Lamp Department, General Electric Co., Nela Park, Cleveland.

G-E MAZDA LAMPS

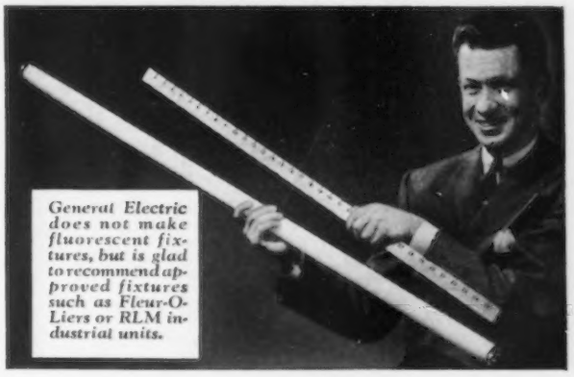
GENERAL ELECTRIC

Year by year, better lamps for every purpose

HOW TO GET YOUR MONEY'S WORTH OF LIGHT!

Whether you operate a laundry or a railroad, General Electric makes lamps to fit your needs. Because G.E. makes all types of lamps, you can be sure of an unbiased lighting recommendation. Perhaps better lighting can play an important part in improving your business.

For example, the new fluorescent lighting can help give your store, factory, office, or restaurant 50 footcandles or more of cool fluorescent "daylight" or white light using G-E MAZDA F lamps alone or with other types of G-E MAZDA lamps. Phone your G-E lamp man or your electric service company for the facts!



General Electric does not make fluorescent fixtures, but is glad to recommend approved fixtures such as Fleur-O-Liers or RLM industrial units.

Having a somewhat similar effect with respect to the use of scrap is the practice of increasing the percentage of pig iron in the open hearth melt. Years ago 60 per cent iron in the charge was considered to be exceptionally high, but in late years some steel making departments have made it a regular practice to charge up to 70 or even 75 per cent pig iron in the open hearth heat. Over a period of years this procedure has made itself strongly felt in the consumption of scrap at those mills where such a practice is followed.

A Threatened Embargo

An intangible but nonetheless an important influence pointed to as a price factor is a self-imposed restraint by buyers and sellers of scrap who believe that this policy is the best deterrent to government price control. Finally, it is maintained that the licensing system for scrap exports may also be looked upon as a threatened embargo which would result in scrap for export being turned back to domestic channels.

As has been suggested by some Washington sources, price fixing of scrap would logically be followed by similar action regarding pig iron and steel, just as happened during the World War. Washington clearly is satisfied with present prices of pig iron and steel and indeed practically boasts that pressure it has exerted has kept the market at a level which officials affect to think would not otherwise exist. Even now the consensus in the steel trade, according to reports coming to Washington is that present prices will be reaffirmed for fourth quarter delivery, barring unforeseen developments and possible readjustments because of certain raw material costs. It is pointed out that steel prices today are somewhat lower than they were early in 1937 and except for one or two products there has been no change in the published steel quotations since June, 1938, when price reductions were announced. This was the situation despite the fact that wage rates remained unchanged at the peak 1937 levels.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

WHY, IT LOOKS LIKE A MILLION A MONTH! WE CAN BUY THE PATENTS FOR A SONG!
TAKE IT SLOW--WE TRIED SLUMP'N LIKE THAT IN 1918 AN' ALMOST LOST THE SHOP!
I THINK THE OL' MAN IS GITTIN' STUPID WITH OLD AGE, PICKIN' A MODERN KID LIKE THAT FER HIS ASSISTANT
NO, HE'S GITTIN' FOXY WITH AGE-- HE'S SMART ENOUGH TO KNOW THAT YOUTH IS FULL O' IDEAS AND PEP--IN OTHER WORDS, YOUTH KEEPS TH' OLD UP AND TH' OLD KEEPS YOUTH DOWN-- GIT IT?
8-23
J.R.WILLIAMS
THE PERFECT COMBINATION
COPR. 1940 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.

NLRB Again Backs Claims of SWOC

Washington

• • • **Acting upon a complaint** made by the SWOC on behalf of the CIO's Amalgamated Association of Iron, Steel and Tin Workers, the National Labor Relations Board has directed the Standard Steel Works Co., Burnham, Pa., to disestablish its relations with the Independent Steel Workers as a Collective bargaining agency. The board dismissed allegations that the company had discriminated against six employees, finding that the men were not laid off or demoted because of union membership or activities. Board member Leiserson did not participate in the proceedings.

Mr. Leiserson also has dissented from a decision on Wednesday of last week of the other two board members, Chairman Madden and Edwin S. Smith, who have ordered an election among production and maintenance employees of the Precision Casting Co., Inc., Lakewood, Ohio, to determine whether or not they desire to be represented for the purpose of collective bargaining by the CIO's Association of Die Casting Workers. At issue is the question of a contract the company has with the Precision Employees Association. The company contends that the validity of the contract must first be determined before an election can be ordered.

The two board members concluded that the contract was not a bar to an election at this time because (1) the contract was entered into after the CIO had filed a petition for investigation and certification, (2) prior to the execution of the contract, the company had notice that the CIO claimed to have been designated by a majority of the company's employees as their sole bargaining agent; (3) since the only proof of employee adherence to the association at the date the contract was entered into is the employee signatures to the contract after it had been drawn up, the record does not clearly establish that the association was the chosen majority representative at that date; and (4) prior to the execution of the contract, the

company had notice that the CIO had filed charges with the board alleging that the company had dominated and interfered with the formation and administration of the association, and had contributed support to it, in violation of the Act.

↓ ↓

Washington

• • • **The National Labor** Relations Board last week ordered Sunday Lake Iron Co., a subsidiary of Bethlehem Steel Corp.; Youngstown Mines Corp., subsidiary of Youngstown Sheet & Tube Co.; and the co-partnership managing the mines, Pickands, Mather & Co., to disestablish employee representation plans at their Michigan mining properties.

During the week the NLRB also ordered the Westinghouse Air Brake Co., Wilmerding, Pa., to bargain collectively upon request with the CIO's electrical, radio and machine workers union.

Elections at the following plants were scheduled by the board:

1. Consolidated Steel Corp., Maywood plant, Los Angeles, to permit employees to vote for the CIO's Amalgamated Association of Iron, Steel and Tin Workers Union; for the AFL's Los Angeles County Metal Trades Council; for the Employees Association of Consolidated Steel Corp., or for none.

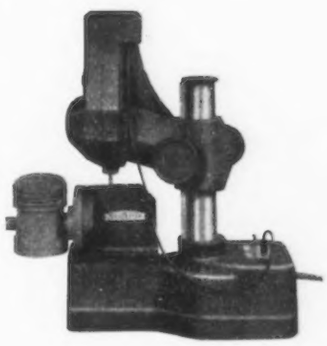
2. Birmingham Tank Co., a division of Ingalls Iron Works Co., Inc., Birmingham, Ala., to permit employees to vote for or against the AFL's International Association of Bridge, Structural and Ornamental Iron Workers Union.

3. Electric Auto-Lite Co., Buckeye Bumper Division, Springfield, Ohio, to permit employees to vote for the AFL's automobile workers union, or the CIO autmobile workers union.

4. Hummer Mfg. Co., Springfield, Ill., to permit employees to vote for or against the AFL's machinist union.

The NLRB, at the request of the union, removed the name of the SWOC's Amalgamated Association of Iron, Steel & Tin Workers Union from the ballot in a forthcoming election at the James Mining Co., Iron River, Mich. Employees will vote for or against the Independent Mine Employees Union.

THE HIGHEST TRIBUNAL in precise measurements



THE Sheffield Visual Gage is a supreme court of accuracy in the inspection department, and its decisions don't need interpretation.

The Visual Gage is simple to set up, easy to operate, and in service is the most rapid precision gage available. Accurate readings are flashed on the scale instantly when the work part is passed under the gaging point.

There is nothing in the mechanical assembly of this gage to wear out of adjustment. The device used for magnification (the Reed Mechanism) is mechanically positive and frictionless. It needs no periodical adjustment, and is foolproof.

In addition, the Sheffield Gage has greater capacity and greater flexibility than other precision gages, although these advantages do not carry with them the penalty of higher costs.

Write for further information.

SHEFFIELD
GAGE CORPORATION • DAYTON, OHIO, U.S.A.
MASTER GAGEMAKERS
NITRIGAGES

Fatigue Cracks

BY A.H.DIX

Word-Coiner

• • • You saw that booklet "Whitey" Maurath holds in his ad on page 28 of last week's issue, entitled, *"How to Lose Customers and Influence Insomniaists."* We thought he meant *insomniacs* and rushed to the dictionary to make sure there isn't such a word as *insomniaists.* There isn't.

Overhead Zero

What worries us is that there are some firms with brass hats who have retired from work but not from salary. You might call them business zombies. But one we don't have to worry about is the . . . Mfg. Co., St. Paul, Minn., which just sent in one of those "information free" cards (see page 59), signed by J. . . . . ., who gives his title as "president and drill press operator."

Waterlogged Miners

In view of France's aversion to water as a potable, we question the accuracy of this observation on page 64 of the Aug. 8 issue:

> More than 50 per cent of the North French coal mines are abandoned, the workmen having fled, and most of them are full of water . . .

'Way Back to Taft's Time

• • • We are not one of those who foam at the mouth every time a letter comes in with our name or address wrong, for we know how difficult it is to keep a mailing list even reasonably accurate.

But we did drool a little when a letter came in the other day from one of the five biggest companies in the industry with a stencilled address your favorite family journal left thirty-one years ago. It would be nice if some enterprising paper manufacturer would put out a card stock guaranteed to disintegrate in five years, so that those of us who haven't the moral courage to throw out a list would be forced to rebuild it at least every half decade.

Squawk

• • • Another word that gripes us is "importantly," as used by an automotive big shot in Bill Sherman's "On the Assembly Line"—*"Another factor importantly influencing the production of defense material is the difficulty . . ."* True, it saves a couple of words, but it is ugly, and besides too much compression slows the flow of ideas from the printed page to the reader's mind. Or maybe it's the heat.

We Have a Genuine Willkie—Or His Secretary's

• • • We sent Wendell Willkie a clipping of John H. Van Deventer's "Help Wanted" editorial and told him we are being swamped with requests for reprints of it. He wrote back from Colorado Springs:

> I am deeply appreciative of the position which THE IRON AGE has taken, as set forth in the editorial which you enclose. It is such support that will make it possible to write your suggested postscript some months from now.

The suggested postscript was "He got the job."

We will save the Willkie autograph in the hope that, like Button Gwinnett's, it will command a substantial price in the years to come. Our hopes are not high, however, as we held a "T. Roosevelt" for a long time and then found it was worth only a quarter.

New Names

• • • Youngstown Sheet & Tube's J. W. Stock says, *"How about 'Ironic Ague?'"* An anonymous reader contributes, *"Ignored By the Censor."*

We think of them what Mischa Auer thought of the ability of his ballet dancing pupil in *"You Can't Take It With You."*

Plate Your Dogs

• • • Always eager to plug the products of our loving friends, gladly we spread the tidings that athlete's foot is now being cured by the electroplating process.

The disease is due to a fungus growth. Copper is a fungicide. We learn from Ohio State University's "Science and Appliance" that by using copper salt as an electrolyte, a mild current drives the copper to the lower layers of skin which are difficult to reach with a surface application of any sort.

Before The Deluge

• • • Although THE IRON AGE has probably a larger intraplant circulation than any other trade paper (abetted by the fact that we supply specially-printed routing forms free of charge), interplant circulation is rare.

But not so among the thrifty Belgians. Six months ago this letter was received from the Laminoirs du Monceau, of Méry, Belgium:

> *"We read your publication through an arrangement with a circulating library. When things settle down a bit, we may subscribe directly."*

An eon has passed since that was written.

Slogan—For Sale or For Nothing

For next to nothing the G.O.P. can buy the rights to a slogan that flashed on us in an off-moment, *"Where There's a Willkie There's a Way."* In view of the limited market for the slogan, we'll give it to them if they won't let us share the five million.

Writers' Francs Cut Off

We see by the papers that French editors' salaries are being leveled to the standard of printers' wages. Here that would be a raise.

Cheers and Cheers—And Only Two Bronx

The series on the defense program by Col. H. A. Toulmin, Jr. (see page 29) has set off a barrage of bouquets, with only two cabbages so far. The entire series will be reprinted when completed. If you asked for copies we wouldn't say no—a few, free gratis for nothing; quantities at cost. Write us at 100 E. 42nd St., N. Y.

Puzzles

Thomas Abraham didn't give us the answer to last week's aerial headache. It was over our head, so we will have to wait until the master minds are heard from.

A few minutes ago a Mr. Brown of Bankers Trust phoned this one to us:

> *A crawling insect is on the end wall of a room 40 ft. long, 20 ft. wide, 20 ft. high. The insect is 6 ft. up from the floor, and 10 ft. in from either side wall. It is to crawl to a point midway between floor and ceiling of either end wall and 6 ft. from the side. What and how long is the shortest path?*

He said all but one of a Sheffield graduating class flunked it, so if you can figure it out over the weekend you automatically become a PBK.

DO YOU know that an old pump, seemingly faithful, can actually be in conspiracy to keep your power bills high?

If that pump is ten or more years old, regardless of condition, it is almost a certainty that it is costing you at least 10% more to operate than it should.

Today's Fairbanks-Morse Pumps of more efficient design, made by improved methods, actually pay dividends equal to 10% or more of the power cost of present obsolete pumps and pay additional savings in lower maintenance.

Why not investigate? Write Fairbanks, Morse & Co., Dept. 47, 600 S. Michigan Ave., Chicago, Ill. Branches and service stations throughout the United States and Canada.

* * *

Fairbanks-Morse Centrifugal Pumps—a complete "family" of single-stage, split-case, centrifugal pumps for low, moderate, medium, and high heads, with capacities to approximately 6000 gallons per minute for heads up to 280 feet. Write for Bulletin 5810D.

Fairbanks-Morse builds the right type of pump for every job—and builds the *right type right.*

7819-P440.68

FAIRBANKS·MORSE PUMPS

DIESEL ENGINES ELECTRICAL MACHINERY RAILROAD EQUIPMENT WASHERS-IRONERS STOKERS
MOTORS FAIRBANKS SCALES WATER SYSTEMS FARM EQUIPMENT AIR CONDITIONERS

News of Industry . . .

63% of June Scrap Exports to Britain, Japan, Italy Shipped from East Coast

• • • **About 16 per cent,** or 52,232 tons, of all scrap exported in June was shipped from the New York customs area, with 75 per cent of the shipments from that port going to Great Britain, a study of the latest customs statistics of the Department of Commerce reveals. Total scrap exports for June were 317,202 tons.

New York is still the principal exporting area, the data indicate, with Massachusetts the second largest, and Michigan, due entirely to shipments to Canada, third largest. Galveston, heretofore the second most important port, was in fourth place in June, with Florida in fifth position.

Shipments from the eastern seaboard to the three principal foreign buyers, Great Britain, Japan and Italy, accounted for 63 per cent of all scrap exports to those countries in June. Gulf ports made up 23 per cent and West Coast ports 14 per cent.

United Kingdom took 145,127 tons, or 45 per cent of all June exports, while Japan accounted for 15 per cent, or 48,004 tons. Italian shipments were 18,226 tons. Canada, previously not considered an important buyer of United States' scrap, took 36,893 tons in June, principally from the Great Lakes district.

Switzerland took 4800 tons out of New York and 6993 tons out of Galveston in June, a total of 11,793 tons being shipped that country.

The accompanying table shows scrap exports in June to the three largest buyers from principal customs areas.

June Scrap Exports by Principal Customs Districts (Tons)

From	To United Kingdom	Japan	Italy	Total*
Maine and New Hampshire	11,436	.....	.....	11,753
Massachusetts	31,006	.....	.....	31,006
New York	33,261	12,831	.....	52,232
Philadelphia	1,757	895	.....	5,436
Maryland	7,462	879	.....	8,386
Virginia	13,625	.....	2,028	15,653
Georgia	2,243	1,485	7,805	11,630
Florida	13,465†	1,966	4,763	20,221
Mobile	3,740	.....	.....	3,740
New Orleans	7,226	263	686	8,318
Sabine	16,506	.....	2,442	18,894
Galveston	14,593	.....	502	24,485
Los Angeles	.....	18,609	.....	19,025
Washington	.....	14,593	.....	14,154
Total	145,127	48,004	18,226	317,202‡

* Data in this column covers shipments to all countries. ‡ Includes shipments to all countries from all customs districts. † Includes 8,950 tons to British Honduras.

Exports to Canada in June: 14,383 tons from Duluth and Superior customs districts; 24,847 from Michigan; 5270 from Chicago; 2393 from Ohio. Total, (four principal districts) 36,893 tons.

Michigan Steel Tube Widens Range of Products

Detroit

• • • **Michigan Steel Tube** Products Co., 9450 Buffalo Street, Detroit, a manufacturer of welded steel tubing for 32 years, announces that it is now equipped to make boiler tubes, condenser tubes, pre-heater tubes, hot water heater tubes, refrigerator tubes and air conditioning tubes, all of which are pressure tubes. They will be manufactured by electric resistance welding methods to meet A.S.M.E. specifications.

The company has been an important supplier of electric welded steel tubing, mechanical tubing and fabricated tubular parts to automotive companies and parts manufacturers and has supplied automotive propeller shaft tubing which is manufactured to close specifications on wall thickness to eliminate vibration and is hydraulically tested.

The plant is the largest welded steel tube plant under one roof in Michigan, having 200,000 sq. ft. of floor space devoted to manufacture of welded tubing. Sizes of the new line of tubing will range from ¼ in. o. d. to 4 in. o. d., inclusive, in gages 8 to 22. The plant is also manufacturing stainless steel tubing.

Vacations Cut Machine Tool Output in July

Cleveland

• • • **July operating** capacity of the machine tool industry was 88.3 per cent of capacity, compared to 92.3 per cent in June, 1940. Vacation schedules during July account for the temporary decrease in operations, the National Machine Tool Builders' Association pointed out in its latest monthly report.

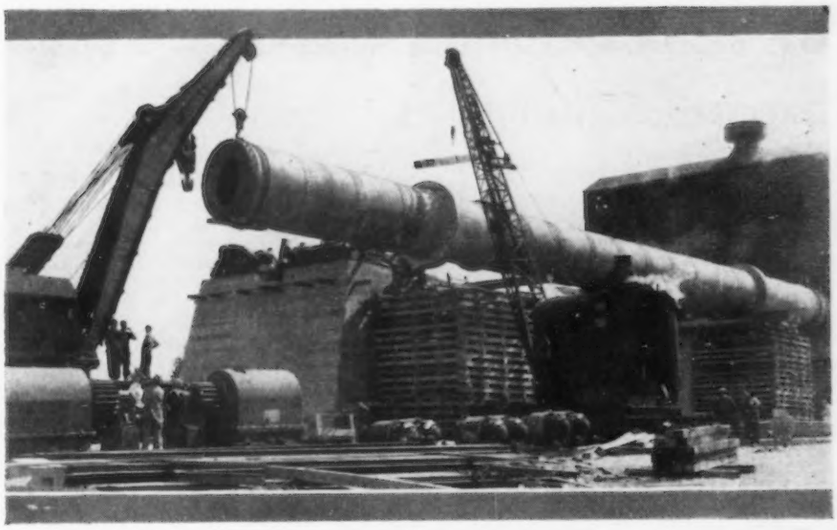
The industry's capacity at the close of July, measured in terms of payroll hours, shows a further increase to 29.9 per cent above September, 1939.

Contracts from Ordnance Bureau Total $279,000,000

Washington

• • • **Of appropriations** amounting to approximately $500,000,000, the War Department's Ordnance Bureau has awarded contracts aggregating $279,000,000. The awards were distributed, in round figures, as follows: Arms and ammunition, $80,000,000; orders placed with arsenals, $76,000,000; automotive equipment, $37,000,000; new plant facilities, $34,000,000; tools and machinery, $4,000,000; educational orders, $825,000; miscellaneous, $47,175,000.

Basic Dolomite Plant Completed at Narlo, O.



• • • **August sees the** completion of a $400,000 plant expansion program at the Narlo, Ohio, property of Basic Dolomite, Inc., basic refractories manufacturer of Cleveland. Begun in late spring to take care of the increased demands of the steel industry for dolomitic and magnesitic refractories, this $275,000 addition to the company's main burning plant will house two new rotary kilns, with complementary processing and loading equipment.

The new kilns are intended primarily to produce the company's dead burned grain magnesite clinker, sold under the trade name "Basifrit" and other magnesitic refractories. These in turn will free other kilns, now employed on magnesitic products, for the manufacture of additional tonnage of the company's dolonitic hearth refractory, Magnefer.

Each kiln, weighing approximately 100 tons, was shipped to Narlo as one continuous steel tube on three railroad flatcars, and erected on its foundations at the plant with the aid of heavy duty railroad cranes.

o o o

July Construction Awards Advance By 33% In July

• • • **Construction contracts** awarded in July in the 37 eastern states amounted to $398,673,000, according to F. W. Dodge Corp. The increase over July 1939 was 33 per cent and the increase over June of this year was 23 per cent. Private construction contracts increased 19 per cent over July 1939, and public construction contracts (reflecting the beginning of awards under the defense program) increased 50 per cent.

o o o

I.B.M. Lets Contracts Enlarging Main Plant

• • • **Contracts have been** let for an addition to the main plant of International Business Machines Corp. at Endicott, N. Y. The building will house a machine shop, tool room and punch press departments. It will consist of two stories and a basement, will contain more than four acres of floor space and will be of steel and concrete construction and air-conditioned. The machine shop will occupy the top floor of the building and will be 140 ft. wide and 450 ft. long.

o o o

Dow Chemical Plans $750,000 Foundry Expansion

Bay City, Mich.

• • • **The Dow Chemical Co.**, of Midland, Mich., is preparing to spend between $750,000 and $1,000,000 in expansion of the Bay City Dowmetal Foundry Division. Approximately 250,000 sq. ft. of plant, office and storage space will be erected. There will be four new plant buildings or additions to existing structures. Construction is expected to start within 30 days. The expansion program, exclusive of additions projected for the future, would make possible a 400 per cent increase over last year's capacity of the foundry. A $100,000 foundry is under construction at Bay City.

o o o

Cleveland Company Lifts Its Forging Capacity

Cleveland

• • • **Steel Improvement & Forge** Co. has taken delivery on a steam hammer standing 24 ft. high and weighing 170 tons. This will be in operation in September in the manufacture of airplane crankshafts and other government work. According to C. H. Smith, president-treasurer, the company is spending around $200,000 and will increase forging capacity by roughly 20 to 25 per cent. At the plant of Park Drop Forge Co. a steam hammer of 35,000 lb. rating is being installed.

o o o

Aluminum Co.'s Mobile Works To Enlarge Capacity

• • • **An increase of 50 per cent** in alumina production capacity has been authorized for the Mobile, Ala., works of Aluminum Ore Co., subsidiary of Aluminum Co. of America, according to Duncan C. Smith, superintendent.

Coming Meetings

Aug. 22—American Hot Dip Galvanizers Association, semi-annual meeting, Chicago.

Sept. 3 to 6—American Society of Mechanical Engineers, fall meeting, Spokane, Wash.

Sept. 18 to 20—National Industrial Advertisers Association, annual conference, Detroit.

Sept. 24 to 27—Association of Iron and Steel Engineers meeting and exhibition, Chicago.

Oct. 2 to 5—Electrochemical Society, Inc., fall meeting, Ottawa, Canada.

Oct. 13 to 16—American Gear Manufacturers Association, semi-annual meeting, Skytop, Pa.

Oct. 16—Porcelain Enamel Institute, fifth annual forum, Urbana, Ill.

Oct. 17 to 19—American Society of Tool Engineers, annual meeting, Cincinnati.

Oct. 21 and 22—Associated Machine Tool Dealers of America, annual convention, Dayton, Ohio.

Oct. 21 to 25—National Metal Congress, Cleveland.

Oct. 31 to Nov. 2—Society of Automotive Engineers, national aircraft production meeting and exhibition, Los Angeles.

Division of Controls Clarifies Export Licensing Restrictions

Washington

• • • **The State Department's** division of controls has released an "unofficial" interpretation clarifying the status of scrap iron and steel, machine tools and a number of other products which have been subjected to the export licensing restrictions under the May-Sheppard law. The division emphasized that the interpretation was not to be construed as a "ruling" and would not be binding upon either the Department of State or any collector of customs.

In further defining the term "No. 1 heavy melting scrap," which is thus far the only grade on which an export license is required, the division adopted the Commerce Department's simplified practice recommendation covering the classification of iron and steel scrap. The interpretation said in this regard that "pending further instructions" licenses will be required for the following iron and steel scrap:

"No. 1 Heavy Melting Steel Scrap: steel scrap ¼ in. and over in thickness, not over 18 in. in width, and not over 5 ft. long. Individual pieces must be cut into such shape that they will be free from attachments and will lie flat in a charging box. Cut boiler plate must be practically clean, free from stay bolts, and not over 3 ft. long and lying reasonably flat in charging box. Smaller dimensions of plate scrap may be included if there is a mutual agreement between buyer and seller. No piece is to weigh less than 5 lb.

"It may include structural shapes, angle bars and plates, steel castings, heavy chain, carbon tool steel, heavy forgings, forge butts, and similar heavy material. It may also include new mashed pipe ends, original diameter 4 in. and over, thoroughly flattened, sheet bars, billets blooms, rail ends, railroad steel, and wrought scrap, such as angles, splices, couplers, knuckles, short rails, draw bars, cut cast-steel bolsters, coil and leaf springs (all coil springs ⅜ in. or larger in diameter). It does not include needle or skeleton plate scrap, agricultural shapes, annealing pots, boiler tubes, grate bars, cast iron, malleable iron, or curly or unwieldy pieces."

The division previously clarified and relaxed the restrictions covering machine tool exports (THE IRON AGE of Aug. 8, page 77-D) but included its latest interpretation these items on which licenses will not be required pending further notice:

Chamfering machines — gear; knife grinding machines; spring winding machines; cold saws up to a capacity of 10 in. round stock; abrasive cut-off machines; portable welding equipment, single operator sets, gasoline or electric motor driven, with capacity up to 600 amp., also generating sets for use with such equipment; equipment using a gas flame for cutting operations; and moulding machines.

Aircraft parts, according to the latest interpretation under the licensing system, were defined to mean:

"Aircraft navigation instruments; aircraft radio transmitting and receiving sets; aircraft gyro instruments; bomb rack controls; frame assemblies; rudder pedals. automatic pilot controls; wing tips; control columns; fuel tanks; struts and braces; de-icers; bomb sights; aerial cameras; parachutes; and the following aircraft engine parts: cowls, magnetos, carburetors, spark plugs, cylinders, crank cases, starters, superchargers and generators, but not component parts of the above-mentioned articles, unless the component parts are exported in such a manner as to approximate unassembled units of the articles listed."

Other general information released by the State Department on the subject of export licensing included the estimate that a time interval of not less than one week should be allowed for obtaining a license by mail.

Packard's Liquid Cooled Powerplants

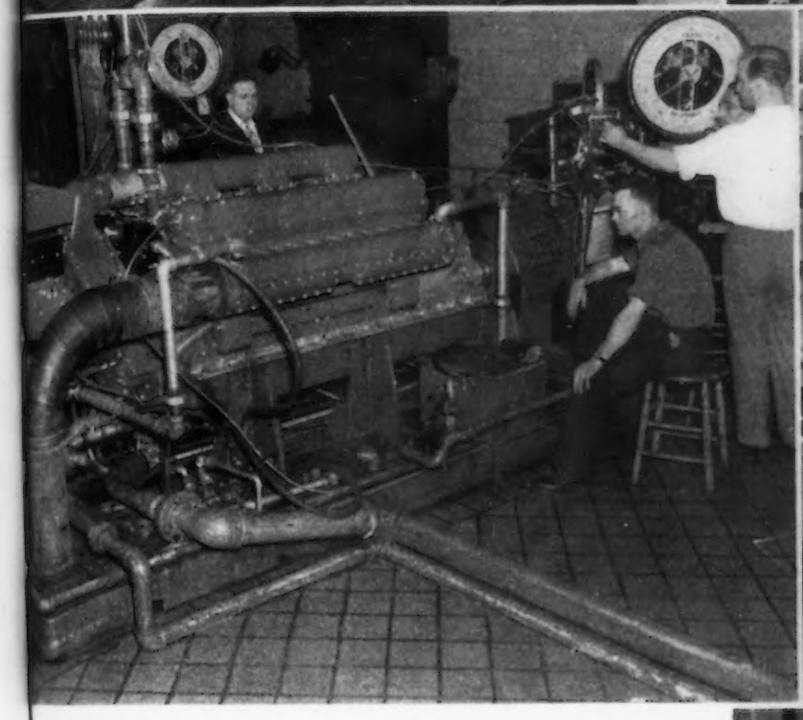
OPPOSITE PAGE, TOP LEFT: Three jig borers, ordinarily regarded as only tool room equipment, hold key positions in the production of Packard's marine power plant. This one, with two jobs set up, is typical of the use made of these machines. Here, the supercharger impeller outer casing (right) and an oil pump housing (left) are bored out and faced off with accuracy held to .0005 in., center to center of bored holes.

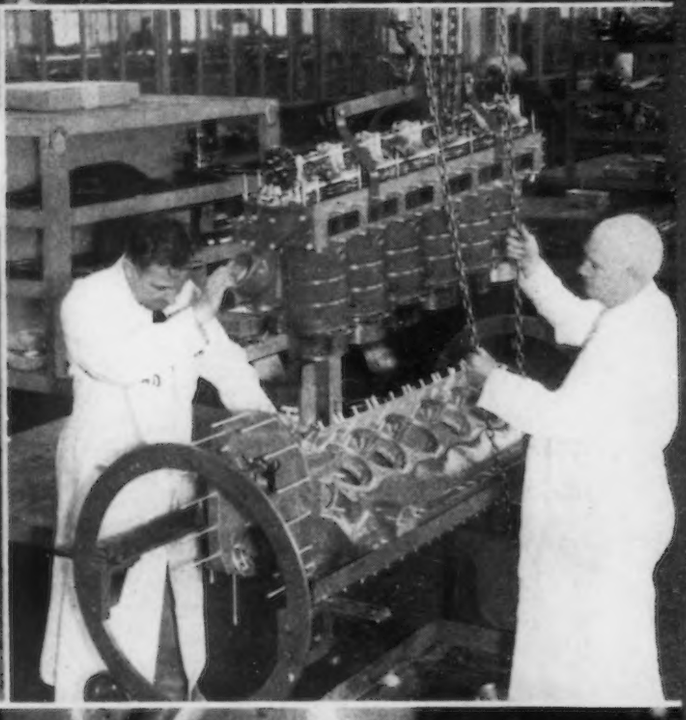
TOP RIGHT: Tools enough to perform 14 operations, each distinct, have been provided to be used with two Sundstrand milling machines. This Hydro-Screw Rigidmil is form milling the connecting rod cap, before the cap is parted from the rest of the forging. Cutters for the other operations are racked nearby. Performed here are: straddle milling the boss on the piston end of the rod; rough straddle milling the bolt head seats and the nut seats on the crank end; rough form milling the cap (shown); finish milling the two roughing operations just mentioned; parting the cap from the rod with a saw cutting tool; rough and finish milling the bolt bosses; hogging out material between bosses to lighten rod assembly; plunge cutting four concave slots in two caps on forked rods; similar cut radial to shaft on the blade-type rods.

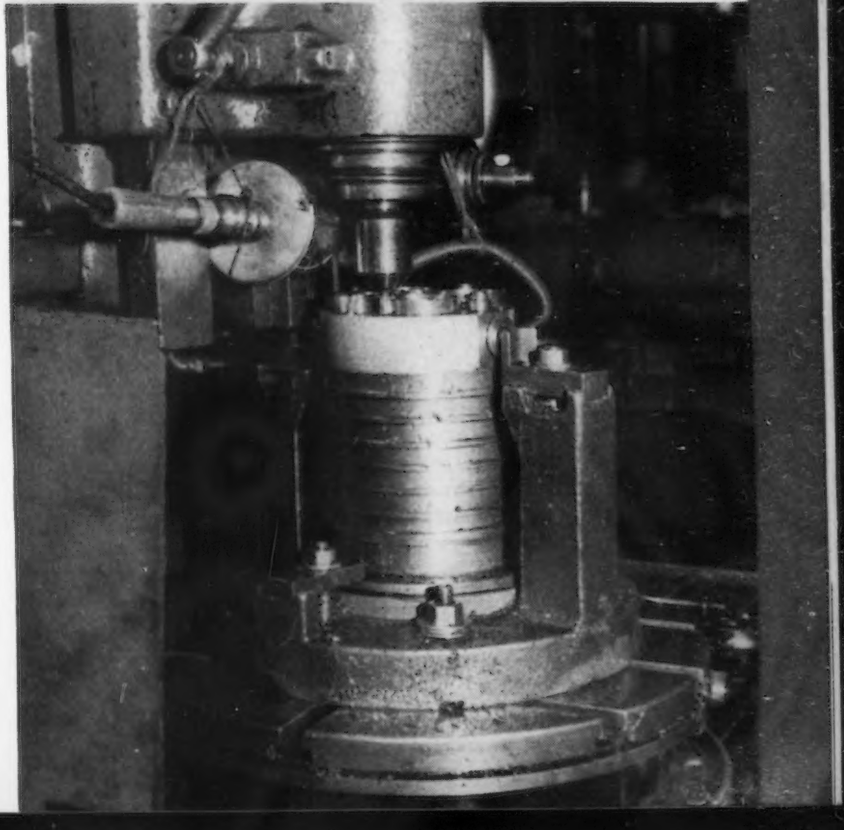
CENTER RIGHT: Final assembly room is air-conditioned. Previous to lowering the sub-assembly to the crankcase, the crankshaft, connecting rods, pistons, etc., are assembled in the crankcase. This view shows admirably the general features of design and construction.

CENTER LEFT: Test stand where each engine is run more than two hours at its peak power output of 1200 hp. at 2400 r.p.m. Total running time before acceptance is 24 hours. Most of these engines will deliver about 1350 hp., however, engineers say. Even at peak output, vibration is negligible and the water cooled exhausts are cool enough to touch with the hand.

LOWER RIGHT: Cylinders are forged of steel, with the top end closed. Around this part, when it is completely machined, a stainless steel water jacket is formed and welded. Intake and exhaust ports (two of each) have been bored and excess material between the holes is being milled out with a profile cutter on this vertical milling machine.







IN THE LIMELIGHT since it was named as prospective producer of 9000 Rolls Royce airplane motors for military use, Packard Motor Car Co., Detroit, is regarded as aptly fitted to tackle the special problems involved in building a high-output precision-made powerplant. Six thousand five hundred of the World War Liberty engines were built by Packard and the organization's post-War record includes manufacture, until 1927, of hundreds of additional aircraft engines, up to 800 hp. each. Driven to cover, literally, when military and commercial popularity of radial air-cooled engines showered virtually all experimental appropriations on the radial types, the company now finds its long experience with high-powered, V-type, liquid-cooled engines is a valuable asset. The cycle is complete, and Europe's present war has brought forth a call for more of the latter types of engines. Presented here is a pictorial record of part of its current activity on a V-12, 60 degree, liquid-cooled engine. Super-charged, it develops 1350 hp. at 2500 r.p.m. Similar engines have been used by Gar Wood repeatedly in Harmsworth Trophy races. Packard is building over 250 of this kind of marine engine at present, for military use. Some of the parts and processes shown here will indicate the kind of problems that will face engineers in tooling for production on a major scale for any similar engine. (See opposite page for detailed description of these Iron Age photos.)

Heavy Steels Are 42% Of '40 Exports So Far

• • • **Heavy steel products,** including ingots, blooms, etc., shapes, plates and rails and accessories, accounted for 42.1 per cent of all steel exports in the first six months of the current year, as compared with 27.1 per cent in the first half of 1939, it is indicated by an analysis of the report of production for sale of the American Iron and Steel Institute (see THE IRON AGE, Aug. 8, 1940, page 80, and Aug. 10, 1939, page 121).

The heavy British demand for semi-finished steel in the early stages of the war boosted the percentage of all exports represented by this item to 26.2 per cent, as against 4.2 per cent in the 1939 period.

Demand for plates, on a percentage basis, showed a substantial decrease, while merchant bar exports were slightly higher.

Sheet exports in the first half of the present year dropped sharply to 14.5 per cent, from 27.8 per cent in the first six months of 1939.

Distribution of Steel Sold for Export Six Months Ended June

	1940 Per cent	1939 Per cent
Ingots, Blooms, Slabs	26.2	4.2
Shapes[1]	3.9	5.3
Plates[2]	9.7	14.5
Rails, Accessories	2.3	3.1
Concrete Bars	5.4	4.1
Merchant Bars[3]	9.2	7.0
Pipe, Tubing	6.1	7.4
Wire, Wire Rods	9.6	9.8
Black, Tin Plate	11.2	13.9
Sheets	14.5	27.8
Strip	1.7	2.3
Misc.	0.2	0.6
	100% or 2,709,754 tons	100% or 777,768 tons

Includes [1]piling, [2]skelp, [3]tool steel bars.

Stolper Steel Products Strike is Settled

• • • **The week-old strike** involving some 200 employees of the Stolper Steel Products Corp. has been settled on terms mutually satisfactory, although not disclosed. Production has started and the firm is proceeding with substantial defense program orders.

This is John Garand, quiet, self-effacing inventor of the famous semi-automatic Garand rifle now used by the U. S. Army, who recently stepped before a radio microphone for the first time in his life. His broadcast, presented over Westinghouse stations, was a talk in the interest of national defense.

Southern Territory Rail Rates Drop Sept. 1

Chicago

• • • **Effective Sept. 1** reductions of 15 per cent or more will go into effect on 4000 less than carload and 200 carload rates in the southern classification, western trunk line and official territory where railroads have generally agreed to apply the reduction. The Illinois Central, Norfolk & Western, and the Pennsylvania have already announced their intention of applying inter-territorially the new ratings adopted in the southern territory.

Established primarily to meet competition from other transportation agencies, the reduction will apply to such commodities as agricultural implements and parts, aluminum articles, small arms ammunition, plumbing supplies, chemicals, building sheet metal, cash registers, hardware, printing presses, furniture, metal pipes, machinery and machines, and textile machinery.

Automobile Sales by Factories Increase 22%

Detroit

• • • **A 22 per cent increase** in factory sales of new passenger cars and trucks over 1939 was registered during the first seven months of this year, according to the Automobile Manufacturers Association. Production since Jan. 1 is estimated at 2,776,740 units. July was the seventh consecutive month in which these sales were ahead of the corresponding 1939 month, the report shows. Factory sales for July totaled 237,300 units, a nine per cent gain over July last year. However, the July total was 35 per cent under the June total—a reflection of the usual mid-summer pre-introduction characteristic of automotive sales.

July sales reported by General Motors Corp. show the disposal of 145,064 vehicles in July compared with 173,212 in June and 192,031 in July, 1939. For the first seven months of the year, sales to U. S. consumers total 1,086,885 against 802,492 in the like period last year.

Retail sales of 90,294 Ford cars and trucks and Mercury cars in the United States during July gave Ford the largest month of the model year with the exception of March. The commercial car and truck sales for the month not only exceeded every July since the introduction of the V-8 but topped every July total as far back as 1930. Lincoln-Zephyr sales for July set a record for that line of cars since its introduction. The total was 2,400 units.

$5,000 Competition For Welding Torch

• • • **The Alexander Milburn Co.,** Baltimore, has announced through its president, Alexander Jenkins, that it will pay $5000 "for the submittal of a welding torch which is absolutely proof against 'flash back' under the most onerous conditions, claimed to be encountered in certain welding operations." A committee will determine the winner of the competition.

Textile Mills Challenge Labor Standard Act

Washington

The first challenge to the constitutionality of the Fair Labor Standards Act will be made if the Supreme Court grants a petition for a writ of certiorari that has been filed by the Opp Cotton Mills, Inc., an Alabama cotton textile manufacturer. Seventeen cotton textile mills in Alabama, Mississippi and Louisiana have intervened in the case. The petition seeks review of the decision of the United States Court of Appeals of the Fifth Circuit at New Orleans which refused a petition of the Opp Cotton Mills to set aside an order of the Wage-Hour Administrator establishing 32½c. an hour as the lowest wage which can legally be paid in the production of textiles for interstate commerce.

Recommendation for payment of this wage as the minimum for the entire industry was made by a textile industry committee of 21 members after a vote of 13 to 6. Four employer members of the committee, all manufacturers of cotton textiles, voted against it, as did two public members.

The writ for a review of the decision is based on a number of contentions. Among them are claims that (1) the committee was not properly representative of the different cotton textile producing localities; (2) the committee did not give proper consideration to the case; (3) the procedure followed by the administrator (then E. F. Andrews) was not in accord with the due process requirements of the constitution; and (4) that the delegation of power to the administrator is unwarranted.

July Electric Truck Sales Highest Since July, 1937

• • • **July bookings of** electric industrial trucks rose to a new high for the current year and were in the greatest volume since July, 1937, the Industrial Truck Statistical Association, 208 South La Salle Street, Chicago, reports. During July, 151 units were booked, compared with the previous high of 120 in April.

Convict Seeks Data on Bar Cutting Material

• • • One of the most unusual inquiries ever received by McKenna Metals Co., Latrobe, Pa., has just come from an inmate of a large Eastern state prison. He requested a copy of Kennametal Catalog No. 3, which he had seen advertised in a leading trade journal.

Since Kennametal is a hard carbide tool material which is particularly useful for cutting hardened steel such as used in prison bars, it might be assumed that this particular prospect hoped to use Kennametal to cut his way to freedom. However, the difficulty of preparing a satisfactory tool set-up, together with the fact that his letter passed the censor, indicated that he was interested only in improving the efficiency of the prison machine shop.

G-M Division To Expand Plant At Saginaw

• • • **An addition to the plant** of the Saginaw Malleable Iron Division of the General Motors Corp., the second expansion of this unit this year, announced by William H. Doerfner, plant manager.

Rockford, Gary Train Workers for Defense

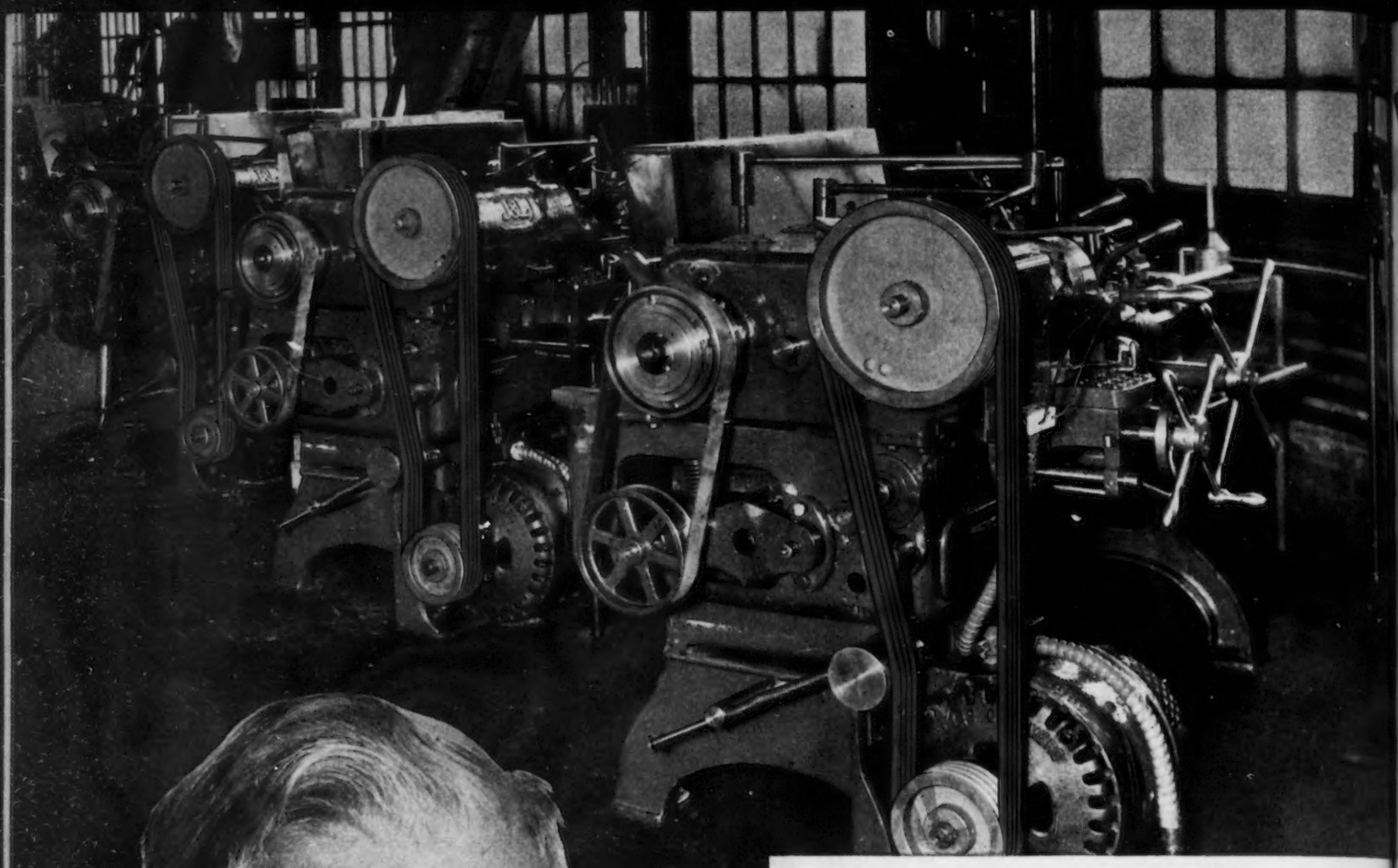
Chicago

• • • **The important** machine tool town of Rockford, Ill., and the strategic steel center of Gary, Ind., with Federal aid, have established instruction courses for the conversion of common and semi-skilled labor into skilled labor.

At Rockford, machine shop and welding courses have been established and an attendance of 129 has already been recorded. The courses were instituted under the auspices of the federal government, the state board of vocational education and the Rockford board of education, and are open both to employed and unemployed men.

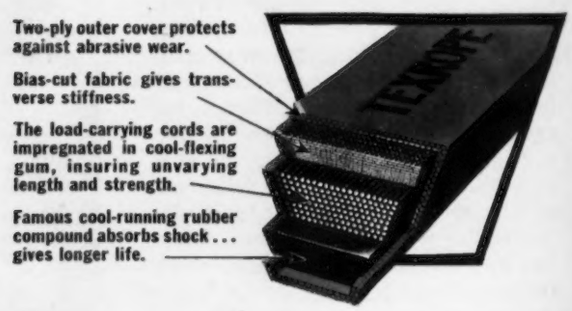
At Gary, two special industrial trade training courses have been started, each class consisting of 20 students selected from the WPA work rolls and the state unemployment services roster of unskilled employables. Both courses are federally financed and are being conducted in Gary high school buildings.

WHEN AN AGRICULTURAL country like Brazil, land of coffee and palm trees, builds its own destroyers, it makes news. Shown here is Dr. Getulio Vargas, president of Brazil, at the recent laying of the keel of a 1400-ton destroyer at Rio de Janeiro. Just completed is another 1500-ton destroyer, the "Marcilio Dias." A third destroyer is also being built at the Arsenal Marinha, Ilhas das Cobras, Guanabara Bay. This navy yard (started in 1922) was built by German engineers. For many years a U. S. naval mission has cooperated in development of Brazil's navy.



See How These Texrope Features Save You Money!

BACK OF TEXROPE'S unusual performance records are the many distinctive features that go into these belts, as illustrated below.


Two-ply outer cover protects against abrasive wear.
Bias-cut fabric gives transverse stiffness.
The load-carrying cords are impregnated in cool-flexing gum, insuring unvarying length and strength.
Famous cool-running rubber compound absorbs shock . . . gives longer life.
TEXROPE

Wedge Design Helps Give Efficiencies Up to 98.9%!

Texrope belts are *true V-belts* — straight-edged from precise moulds. With the Texrope "wedge" design, there is no slipping . . . no jerking. Efficiencies up to 98.9%.

New, Special, Cool-Running Rubber Compound Provides Longer Life!

To meet the tough demands of day-in and day-out

TEXROPE DRIVES CUT

"I WAS DEAD WRONG!"

"I Always Had the Idea V-belt Drives Were Pretty Much Alike! But That Was Before I Discovered Texrope V-belt Drives . . . the Drives that Cut Transmission Costs!"

"NO SIR! All V-belt drives are not alike! I used to think so . . . but that was before I learned some rather amazing facts about Texrope V-belt Drives...

"For instance — Texrope belts are made with a newly developed rubber compound so cool-running that it actually gives the belts years more service!

"Another thing—Texrope belts are *truly* straight-edged from precise moulds and have the special Texrope 'wedge' design for extreme pulling power!

"Also — they are measured down to 1/100th of an inch and 'matched' into sets . . . a highly important factor in even-wearing and even-pulling."

Specify Texrope and Protect Your Profits!

And there are a lot of other differences, too — differences that mean longer life . . . lower maintenance . . . greater dependability . . . all the things a plant executive is looking for these days in his transmission equipment.

That's why you should read carefully the list of Texrope features in the center panel. They are the reasons why Texrope Drives have skyrocketed to number one position as the most popular way to transmit power to a machine.

Specify Texrope and protect your production schedules . . . and your profits! For complete facts, see the nearest Texrope representative . . . or write Texrope Division, Allis-Chalmers, Milwaukee, Wisconsin.

A 1271

Belts by Goodrich

operation, Texrope belts have been made with a new, special, cool-running rubber compound that actually increases belt life 100 to 200% over belts of only a few years ago.

Matched Into "Sets" for PULLING Together!

Now, with a newly developed measuring machine, every Texrope belt is tested in a grooved sheave running under normal operating tension . . . and the exact length to 1/100th of an inch is registered on a finely calibrated meter. This means that "sets" of Texrope belts *pull together* . . . wear evenly . . . give longer life.

Backed by Allis-Chalmers 90 Years of Engineering!

Multiple V-belts were originated and developed by Allis-Chalmers engineers. This same huge engineering staff is prepared at all times to help you on your drive problems . . . to make it easier for you to save money and get better transmission efficiencies.

A Size to Fit Your Needs!

Available in five standard cross-section measurements, and for drives from fractional to 2,000 hp, there's a Texrope Drive that exactly suits your requirements . . . saves you money!

★ Adequate Stocks Carried Throughout U. S. A.

Get Texrope Drives and replacements instantly from Allis-Chalmers warehouses and distributor stocks in all main centers.

TRANSMISSION COSTS

A Letter to Bill from Dad

Dear Bill:

• • • IN YOUR LAST LETTER you said that you had not yet made up your mind how to vote in November and that you would like me to give you my ideas as a life-long worker and wage earner. So here goes.

To my mind, this will be the most important election for working people since Lincoln's time. For what happens during the next four or eight years is going to determine where labor gets off in the United States for a long time to come.

Times have certainly changed, Bill, since I was your age. I remember the torch light parades that we had for Grover Cleveland. In those days if you switched your vote from one party to another, your friends considered you in the class of Judas and Benedict Arnold. Today, people like you and me that have had to do our own thinking do not take party lines so seriously.

I don't think that this is because people have changed so much as it is because parties have. When I was young, the Democrats stood for "free trade" and the Republicans for "protection."

TODAY, AS YOU KNOW, this difference has gone out the window. Both are for national defense, for keeping us out of war and for making everybody at home as happy and prosperous as possible.

Nowadays in choosing whom to vote for, I try to figure out which candidate is likely to do me and my kind the most good. And I don't base my judgment on promises of future performance.

As I see the proposition from labor's standpoint, we are divided into three groups, the unemployed, the employed, and the employers. I'm still punching a clock and pulling a pay envelope, so I'm going to look out for the interests of employed workers, as I see them. I want steadier work, more hours of work per year and a chance for better wages in real money. I don't want inflation, because the money you get then is counterfeit and not real money. At one time everybody in Germany was a millionaire—in paper marks. But they wouldn't buy anything.

PERHAPS MR. ROOSEVELT has tried to do a good job for the unemployed. I think that he has not tried to do so much for the employed, such as we are. For example, when he found that he could not put the unemployed back to work—there are still as many of them as ever—he devised all sorts of plans to support them. But did you ever stop to think who provides the money to do that? Not Uncle Sam, not Mr. Roosevelt nor Mr. Morgenthau. You and I and fellows like us who are in the employed class foot the bill for that together with the employers.

Maybe you haven't thought about that, but that is one reason why you can't put in more than so many hours a week. And why the concealed taxes have gone up so high that your wages won't buy within 20 per cent of what they should. Today every four of us wage earners is supporting one unemployed person in these United States. I'm not hardboiled and am willing to do my share of charitable work, but I need money to do it with.

FRANKLY, BILL, I feel that the President of the United States should try to protect the employed by exerting as much effort in their behalf as is put forth for the unemployed. After all, it is the people with jobs who spend the money to keep business going. We fellows are free spenders when business is good. And now that brings me to the third group, the employers. I'm not a boss lover as you know, and I've gone out on strike to defend my rights as I saw them. But I'm not crazy enough, Bill, to think that when business is bad or unprofitable for the boss it is good for the workers. Therefore I say let's give the employers a run for their money so that we can have one too.

I'M FOR WILLKIE, Bill. Yes, I know that he was boss of a big electric company, but he didn't inherit the business. He was once a short order cook in a dog wagon!

I worked once for a guy who inherited his money and his business. He had grand ideas and paid us good wages while the money lasted. But he couldn't work a budget. And the up-shot of that was that when hard times came, as they do, your old man was out of a job.

Just a word more, Bill, and I'm done. We've got a big production job to do in this country. Armament. As a skilled worker you know what that means and what it takes. I want to see somebody in charge of things who knows what it is all about and has made a record of getting things done.

But, most of all, I'm going to vote against a third term. Why? Because both Hitler and Stalin wanted third terms and got them. And where is labor in these countries today?

Love from Pop

1000 Tank Order Goes to Chrysler

Washington

• • • **A $54,500,000** contract with the Chrysler Corp., involving construction of an estimated 1000 tanks of 25 tons each, has been cleared by the National Defense Advisory Commission for the War Department. Out of the total amount of the contract, about $20,000,000 is expected to cover the cost of plant and equipment.

Chrysler Corp. will build and equip the plant with a floor area of 800,000 sq. ft. to be erected on a 113-acre site in the Detroit area, and then transfer title to the government.

Under the arrangements made with the company, the government-owned plant will be leased at a nominal rental fee of $1 a year, operated and maintained by the company and used in the manufacture of tanks to be sold to the government at a fixed price. The plan, described as unique because it eliminates such controversial tax questions as amortization on depreciation allowances, provides not only for the government compensation for the cost of the plan but also for the payment of a 4 per cent commission.

"The plant will embody the most modern practice in tool and machinery design, in lay-out and in plant and production engineering," the War Department said. "It will also be readily adapted to expansion. Thus, the government will be in a position not only to produce tanks in large numbers but also to have a new tank arsenal.

Negotiations which led up to this contract were begun about two months ago. At that time William S. Knudsen, head of the defense commission's production division, requested K. T. Keller, president of Chrysler Corp., to make a study of tank production. Mr. Keller and a group of engineering and production executives immediately went to Rock Island Arsenal to inspect the construction of tanks at that place. Some 200 of the corporation's design, tool, machinery and production engineers devoted their entire time to figuring on the project in detail.

Government Contracts

• • • **Federal contracts** for iron and steel products, as reported for the week ended Aug. 10 by the Labor Department's Public Contracts Division, totaled $6,204,227. For the same period contracts aggregated $1,458,722 for non-ferrous metals and alloys and $2,703,732 for machinery. Details follow:

Iron and Steel Products

Bethlehem Steel Co., Bethlehem, Pa., rivets, $37,078.
The Cleveland File Co., Cleveland, files and rasps, $34,498.
Henry Vogt Machine Co., Louisville, machined shell, $185,155.
Eclipse Aviation, Division of Bendix Aviation Corp., Bendix, N. J., on-carriage parts, $43,331.
Koppers Co., Bartlett Hayward Division, Baltimore, gate tracks, $52,000.
General Metals Corp., Oakland, Cal., castings, $46,197.
Allis-Chalmers Mfg. Co., Milwaukee, housing forgings, $82,720.
Struthers Wells-Titusville Corp., Titusville Forge Division, Titusville, Pa., housing forgings, $138,221.
National Forge & Ordnance Co., Irvine, Pa., gun forgings, $504,309.
Erie Forge Co., Erie, Pa., housing forgings, $534,574.
Capitol Steel Corp. of N. Y., New York City, reinforcement bars, $32,125.
Edgewater Steel Co., Pittsburgh, breech ring forgings, $39,307.
Struthers-Wells Titusville Corp., Titusville Forge Division, Titusville, Pa., forgings, $65,783.
National Pneumatic Co., Inc., Rahway, N. J., mortars & mounts, $133,231.
A. Finkl & Sons Co., Chicago, breech ring forgings, $65,000.
Kilby Steel Co., Inc., Anniston, Ala., mosquito-bar rods, $56,970.
Moline Iron Works, Moline, Ill., buckles, $54,747.
American Safety Razor Corp., Brooklyn, safety razors, $28,476.
The Superior Sheet Steel Co., Philadelphia, terne plate, $29,798.
Bethlehem Steel Co., Bethlehem, Pa., superstructure bridge, $68,240.
Norris Stamping & Mfg. Co., Los Angeles, cartridge cases, $1,673,700.
Crucible Steel Co. of America, New York, shot, $113,236.
Motor Wheel Corp., Lansing, Mich., shell, $67,108.
Kilby Steel Co., Inc., Anniston, Ala., mosquito-bar rods, $41,820.
Apollo Steel Co., Apollo, Pa., roofing galv., $25,693.
Bethlehem Steel Co., Bethlehem, Pa., forgings, $53,900.
Emery Construction Co., Inc., Knoxville, Tenn., operation building structural steel, $57,700.
Budd Wheel Co., Detroit, shells, $1,737,000.

Non-Ferrous Metals and Alloys

Aluminum Co. of America, Massena, N. Y., aluminum conductor, $85,473.
Albert & J. M. Anderson Mfg. Co., Boston, cartridge cases, $116,040.
Aluminum Co. of America, Lafayette, Ind., shapes, $101,252.
Aluminum Co. of America, New Kensington, Pa., aluminum-alloy tubing, $65,336.
Fairmont Aluminum Co., Fairmont, W. Va., aluminum alloy sheet, $46,411.
Aluminum Co. of America, Alcoa, Tenn., aluminum alloy, $274,402.
Aluminum Co. of America, Massena, N. Y., aluminum alloy, $600,000.
Magna Mfg. Co., Inc., Haskell, N. J., powdered magnesium, $54,720.

Machinery

Judson-Pacific Co., San Francisco, traveling cranes, $64,920.
Rockford Machine Tool Co., Rockford, Ill., planers, $49,088.
Worthington Pump & Machinery Corp., Harrison, N. J., pumps, $46,352.
Brown & Sharpe Mfg. Co., Providence, milling machines, $38,433.
National Broach & Machine Co., Detroit, milling machines, $102,560.
Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, milling machines, $34,200.
Worthington Pump & Machinery Corp., Harrison, N. J., pumping units, $182,609.
Iowa Mfg. Co., Cedar Rapids, Iowa, crusher units, $29,507.
The Cleveland Tractor Co., Cleveland, tractors, $76,462.
Lloyd & Arms, Inc., Philadelphia, engine lathes, $20,185.
The National Acme Co., Cleveland, screw machines, $56,524.
Kearney & Trecker Corp., Milwaukee, threading machine, $37,450.
Continental Motors Corp., Muskegon, Mich., engines, $1,442,275.

• • • **Navy and Army** contracts have been awarded as follows:

Navy Contracts

Mueller Brass Co., Port Huron, Mich., naval brass, $156,423.
Titanium Pigment Corp., New York, titanium-barium, $86,220.
Collyer Insulated Wire Co., Pawtucket, R. I., electric cable, $281,857.
Wheeling Corrugating Co., Wheeling, W. Va., iron or steel buckets, $22,616.
Walworth Co., New York, valves and cocks, $21,116.
Westinghouse Electric & Mfg. Co., Washington, D. C., arc welding sets, $44,261.

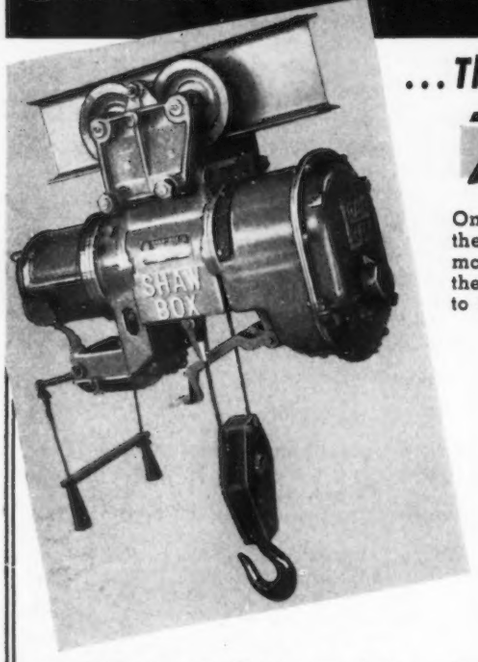
(See Next Page)

The Warner & Swasey Co., Cleveland, turret lathes, $45,945.
Reed-Prentice Corp., Worcester, Mass., lathes, $15,220.
Henry Prentiss & Co., Inc., New York, turret lathes, $35,133.
Carnegie-Illinois Steel Corp., Pittsburgh, steel, $11,038.
Jones & Laughlin Steel Corp., Pittsburgh, steel, $21,834.

War Department Contracts

Lansdowne Steel & Iron Co., Morton, Pa., forgings, $133,518.
National Tube Co., Pittsburgh, forgings, $52,276.
General Electric Co., Federal and Marine Department, Schenectady, N. Y., equipment, $201,090.
American Locomotive Co., New York, artillery carriages, $1,132,200.
S. B. Mark Co., Inc., New York, cleaning and preserving material, $115,240.
Brown & Sharpe Mfg. Co., Providence, machines, $96,201.
Link Belt Speeder Corp., Chicago, power shovels, $302,941.

Your Electric Hoists Should Be "Shaw-Box"!



...They Cost Less To Operate

7 Reasons Why

Only in Shaw-Box Hoists can you get these features that make them the most economical hoists to use, and for the work they do the least expensive to buy.

1 — "One-Point" Lubrication System
2 — Interchangeable Suspension
3 — "Fool Proof" Upper Stop
4 — Two-Gear Reduction Drive
5 — "Hyatt" Roller Bearings
6 — Totally Enclosed Construction
7 — Ball Bearing Motors

Shaw-Box Electric Hoists are doing the lifting in thousands of plants across the country, in all industries — lifting jobs like yours . . . Always they have speeded production, taken the burden from men, lowered costs and increased profits.

In the Shaw-Box line of Electric Hoists you will find the one you seek for your own necessities . . . Sizes range from 250 pounds to 20 tons lifting capacity in combinations and arrangements to meet every requirement of industry . . . Back of them are the hoisting experiences of operating men in thousands of plants in all industries, and, the experience of more than half a century devoted to the development and manufacture of cranes and hoists exclusively.

Send for catalog that contains complete information and many illustrations of profit making installations that may suggest an application to you.

Makers of all types and sizes of Electric and Hand Operated Cranes, and Electric Hoists, including the famous Portable Electric "Budgit" Hoists . . . ***Send all your inquiries for cranes and hoists to "Shaw-Box"!***

SHAW BOX CRANE & HOIST DIVISION
MANNING, MAXWELL & MOORE, INC.
402 Broadway MUSKEGON, MICHIGAN

Inquiries Reach Defense Board On f.o.b. Mill Bids

Washington

• • • **Announcement that** bids for the purchase of large quantities of critical and essential items by the War Department's Quartermaster Corps may hereafter be invited on an f.o.b. mill basis, last week prompted a score of inquiries on possible implications of the move but officials in the National Defense Advisory Commission minimized the development as extremely limited in scope and unlikely to be followed by any further change in purchasing policies which would affect products distributed under the basing point system.

Sources close to the defense commission also expressed doubt that the announced change portends anything of importance for the steel industry. It was pointed out that it was highly unlikely that any radical departure from well-established pricing and marketing systems would be encouraged by the government during the existence of the present emergency.

"Hereafter, bids on large orders may be invited on an f.o.b. factory or plant basis," said a statement released by the defense commission, whose information was based on an exchange of correspondence between the Quartermaster General and Donald M. Nelson, coordinator of defense purchases. "Awards will be made to the lowest responsible bidders, disregarding cost of transportation from plant or factory to government destination. No reference will be made to possible destinations.

"In other words, the invitation will call for a certain quantity f.o.b. plant for shipments to any destination that the interest of the government may require. In all cases where the government is to furnish material, bidders will be informed that such material will be delivered to the plant or factory without expense to the contractor. Invitations will advise bidders that the earliest possible

deliveries are required and the government reserves the right to give preference to early deliveries.

"This policy will allow plants far removed from government depots to compete successfully with plants located near to the depots."

An earlier announcement on the same day—Aug. 15—said that the new policy would be followed by the War Department, but the statement subsequently was withdrawn and corrected with the explanation that the decision to invite bids on an f.o.b. mill basis was applicable only to purchases by the Quartermaster Corps.

The Quartermaster Corps, which has ten field purchasing offices, confines its purchases to motor vehicles, machinery and supplies and other items classified as subsistence and clothing. It does not buy steel, lumber or cement for the Army but typical purchases include machine tools, hand tools, machinery and other equipment for motor transport shops.

At the Federal Trade Commission, the government agency which has repeatedly advocated abandonment of the basing point system in favor of an f.o.b. mill pricing system, it was indicated that the commission had no part in the decision of the Quartermaster Corps to seek bids on an f.o.b. mill basis. While expressing interest in the announcement, FTC officials declined comment, explaining that they had not analyzed the text of the order in detail.

In the same announcement by the defense commission it was disclosed that the Quartermaster Corps will hereafter allow "split bidding"—a system under which bidders will be able to contract for only part of an entire order.

Memo to Open Hearth Boss: Watch That B.O. Content

• • • **"Manganese is used** to purify and deodorize steel."—Statement in an article published by New York *Times*, Saturday, Aug. 17.

U. S. to Take Machine Tools Built For Export to Ease Choke Points

Washington

• • • **Prompted by pressing** national defense needs, the United States government is planning to take over foreign-owned machine tools, which, because of restrictions against their exportation, are being held at docks or remain in the hands of American manufacturers.

Legislation authorizing the President to requisition machine

TYPE ENK PRESS WELDER

A new line of press welders containing new features by TAYLOR-WINFIELD is now available in capacities from 30 to 75 KVA, and with working throat depths of 12" to 30".

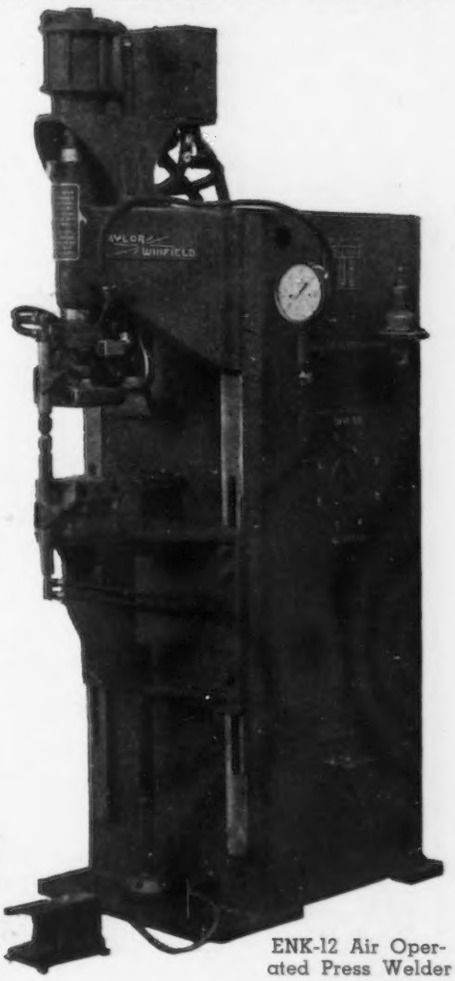
Adjustment of knee is accomplished without disturbing secondary connections.

Universal alignment of projection welding die sets.

Spot welding horns and points may be used without disturbing the projection welding dies.

Available for air operation, motor drive or hydraulic operation.

Write for bulletin No. 309 which describes the welders fully.



ENK-12 Air Operated Press Welder

The heart of YOUR PRODUCT is the joint
WELD IT
TAYLOR WINFIELD

The TAYLOR WINFIELD Corporation
WARREN, OHIO, U.S.A.

MANUFACTURERS OF ELECTRIC, BUTT SPOT AND SEAM WELDERS

REPRESENTATIVES IN ALL PRINCIPAL CITIES

TAYLOR-WINFIELD WELDERS ARE MANUFACTURED AND SOLD IN EUROPE BY AB. ASEA SVETSMASKINER, STOCKHOLM, SWEDEN, AND IN CANADA BY COMMONWEALTH ELECTRIC CORPORATION, LTD., WELLAND, WALKERVILLE, TORONTO, AND MONTREAL.

tools and other vital defense materials has been drafted and will be rushed through Congress. Of immediate concern to the military authorities is the requisitioning of machine tools, but other national defense requirements which had been ordered for export also can be taken over under the legislation and it is likely that alloy steel will be among the products to be taken over along with machine tools.

The machine tools and other materials have been held up as the result of a Presidential proclamation of July 2 under the May-Sheppard Act barring exports of essential materials except under license. The quantity and types of machine tools involved have not been announced but it is said that the volume is large and the types numerous. A substantial portion is reported to be machine tools which have been made for Russia.

On the House side the requisition bill was introduced by Representative Faddis, Democrat of Pennsylvania. After short hearings, the Committee on Military Affairs late last week reported the bill favorably, ready to be taken up for early action. On the Senate side a companion bill was introduced by Senator Hill, Democrat of Alabama, and it also is expected to be quickly reported out after the Senate Committee on Military Affairs gets reports from government executive departments.

The bill provides for recovery of the requisitioned equipment and materials from foreign buyers at a fair market value "without any allowance for profits, punitive or other damages." The bill does not apply to materials for which there is no intention to export.

Emphasizing the urgency of machine tools for the national defense program, Colonel Rutherford told of a study made of the question of machine tools, their availability and requirements.

"In that study we have found that there are going to be many choke points in the supplying of machine tools both at the present plants that are now in production and the many new plants that will be included under the approved program," said Colonel Rutherford.

He pointed out that there has been a considerable export business in machine tools and because of recent restrictions many have become bogged down at the ports and in some cases they are in the hands of the manufacturers with the title in foreign possession.

"We want authority (to requisition the tools) where the title rests abroad or will rest abroad," Colonel Rutherford told the House Committee. "There are many machine tools on which advance payments have been made and the contract calls for delivery of tools or complete payment when foreign buyers are notified when the tools are available."

These machine tools, it was stated, are now either partially in foreign possession or foreign buyers have "enough of a string on them to prevent our people from getting them."

The bill provides that the owner shall be paid "such sum as the President shall determine to be fair and just."

Toledo Organizes Preparedness Board

Toledo

• • • To coordinate many civic aspects of national defense work in Toledo a preparedness committee has been named by Sydney D. Vinnedge, president, Toledo Chamber of Commerce.

The committee includes Frank H. Adams, vice-president and general manager, Surface Combustion Corp., chairman; Harold Boeschenstein, president, Owens-Corning Fiberglass Corp., vice chairman; Byron A. Fay, vice-president, Electric Auto-Lite Co.; R. R. Johnston, Gulf Oil Corp.; Maj. Gen. Gilson D. Light, adjutant general of Ohio; Earle S. Smith, president, Toledo Porcelain Products Co.; J. E. Snowberger, Willys-Overland Motors, Inc., and others.

The committee will form a clearing house for many policies in connection with the whole national defense effort as it affects Toledo, it was said.

HILLSIDE FLUORSPAR
85% AND OVER IN CALCIUM FLUORIDE
DOES NOT EXCEED 5% IN SILICA • FREE FROM SULPHIDES, LEAD AND ZINC
Steel Manufacturers
Standard Specifications
Shipments from stock
Rail or River
HILLSIDE FLUOR SPAR MINES
38 SOUTH DEARBORN STREET
CHICAGO, ILL.
MINES IN ILLINOIS AND KENTUCKY

House Leaders Oppose USHA in Defense Housing

Washington

• • • **The projected $150,000,000** housing program for defense will be undertaken by private industry with the assistance of the Reconstruction Finance Corp., and the Federal Housing Administration rather than by the United States Housing Authority if House leaders of the defense program have their way.

A considerable group of House members were represented by Chairman Vinson of the House Naval Affairs Committee last week as being opposed to giving USHA any part in the proposed housing program to provide homes for employees of armor plate plants and shipbuilding yards. Mr. Vinson said he hoped private industry would undertake the job of providing housing accommodations for employees needed in defense plants, and not force the government to tackle the job.

Senator Robert F. Wagner, Democrat of New York, co-author of the housing law under which the USHA is functioning, has introduced a bill designed to give the housing agency jurisdiction over the defense housing program, but Congress has demonstrated on a few occasions that it can be cool to any move to extend the USHA activities. Many members are known to feel that the agency has engaged too extensively in lobbying tactics and it was recalled in this connection that the House last year turned thumbs down on a measure to raise the USHA's lending authority from the original $800,000,000 to $1,600,000,000.

More recently USHA representatives are known to have gone into the field with the promise of larger sums to inject new life into the low-cost housing program provided Congress can be induced to vote the necessary appropriations. This disclosure is regarded as another factor tending to delay consideration of the bill to authorize the appropriation of $5,000,000 in subsidies to make possible the lending of $150,000,000 of the USHA's original $800,000,000.

Most recent action taken by the USHA was in approving loans and allocations of $13,773,000 for the construction of 3601 homes for workers in eight defense centers.

Loans were approved for housing projects in these sections:

Bremerton, Wash.—Loan of $2,003,000 to the Housing Authority of the City of Bremerton for two projects, recommended by the Navy Department, totaling 600 dwellings near the Puget Sound Navy Yard.

Charleston, S. C.—Loan of $1,416,000 to the Housing Authority of the City of Charleston for project, recommended by the Navy Department, of 400 dwellings near the Charleston Navy Yard.

Columbus, Ga.—Loan of $2,024,000 to the Housing Authority of

★ SOME ★
FORGINGS
CAN NEVER BE
BARGAINS
at any price!

BUYING FORGINGS on the basis of lowest cost at the point of delivery sooner or later emphasizes the fact that some forgings can never be bargains at any price. A bargain at the point of delivery often piles up an exaggerated cost at the point of assembly, due to higher costs for machining and finishing. Some differences in forgings can be measured, but the differences that count are those that bring reductions in finishing costs and assure lowest cost at the point of assembly. It is the presence of "quality advantages" beyond what the specifications call for that make T & W forgings cost less at the point of assembly. Look ahead, when buying forgings, to the cost of forgings at the point of assembly. Consult a T & W forging engineer on your next forging job.

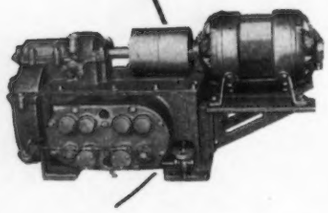
For those manufacturers having their own forging equipment, T & W will gladly quote on die requirements.

T W FORGINGS
USUALLY COST LESS AT THE POINT OF ASSEMBLY

TRANSUE & WILLIAMS
STEEL FORGING CORPORATION
ALLIANCE, OHIO

Sales Offices: New York, Philadelphia, Chicago, Indianapolis, Detroit and Cleveland

. . . . Outstanding
PERFORMANCE
"All-Purpose"
AIR • • •
COMPRESSORS
★ Efficient
★ Reliable
★ Durable



Type "N" Compressor

Two cylinder, single-stage, single acting, gear driven. Air-cooled for intermittent operation, "NB"; water-cooled cylinder heads for continuous operation, "NWB". Has positive and reliable unloader for A.C. motor drive. Sizes 12½ to 100 cu. ft. Pressures from 30 to 150 lbs. Catalog T2048. Write for information and prices.

Many other types and sizes available, up to 200 cu. ft. . . . There is one in this extensive line to meet your specific needs.

70 Years Experience

Westinghouse . . . .
AIR BRAKE CO.
Industrial Division
PITTSBURGH, PA.

Columbus for project, recommended by the War Department, of 614 dwellings near Fort Benning.

Newport, R. I.—Loan of $1,105,000 to the Housing Authority of the City of Newport for project, recommended by the Navy Department, of 262 dwellings near the Newport Naval Station.

Allocations to provide for projects by the War and Navy Departments with funds transferred by the USHA follow:

Army—$1,625,000 for 325 dwellings at Anchorage, Alaska, where a large air base is under construction.

Navy—$1,600,000 for 400 dwellings in the Panama Canal Zone.

Navy—$1,600,000 for 400 dwellings at the Portsmouth, N. H., Navy Yard.

Navy—$2,400,000 for 600 dwellings at the Mare Island, Cal., Navy Yard.

Ryerson Takes Plane Tour of South America

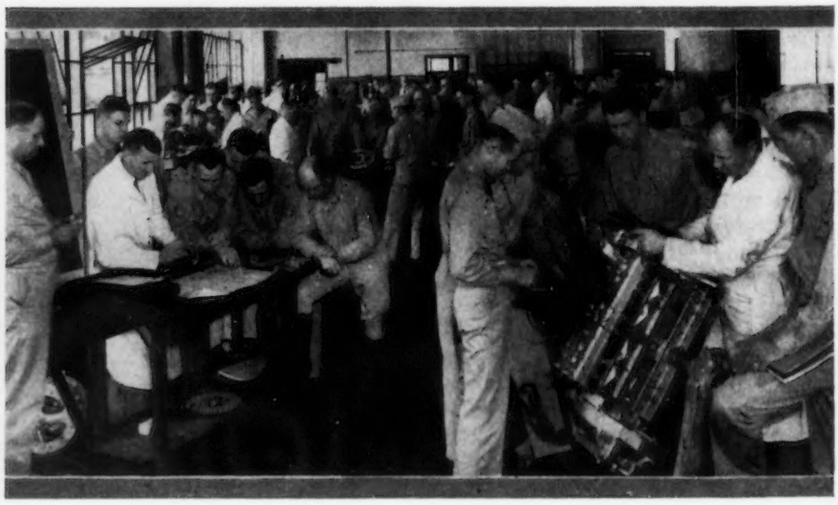
• • • **Edward L. Ryerson, Jr.,** chairman of the board of directors of Inland Steel Co., and Mrs. Ryerson left recently for South America. They took one of the Pan American clipper ships from Miami and flew down the west coast, making a number of stops enroute such as Cristobal, Guayaquil, Lima and Santiago. From Buenos Aires they were to proceed to Sao Paulo and from there to Rio de Janeiro.

Cuban Manganese Output Increased 30,000 Tons

• • • **Capacity of the** Cuban-American Manganese Corp. plant at Cristo, Cuba, will be expanded to permit output of 130,000 tons annually of ferro grade manganese ore by Jan. 1, 1941, according to Langbourne M. Williams, Jr., president. Present capacity of the plant is 100,000 tons of concentrates running about 50 per cent Mn and 50,000 tons of material, used primarily by southern furnaces in making pig iron, averaging about 40 per cent Mn. Output of this latter grade will not be affected by the expansion.

Details of the expansion were revealed shortly after announcement had been made that the Metals Reserve Co., a Government agency established to build up stocks of strategic material, had contracted with Cuban-American for from 25,000 to 65,000 tons annually of ferro grade ore over a three-year period. The lower figure represents the minimum tonnage which may be shipped and the higher the maximum. This order, officials of the manganese company state, will enable the plant to operate at capacity over the next few years.

Enlisted men and non-commissioned officers of the new streamlined motorized fighting divisions of the U. S. Army are shown here being instructed at the army automotive transport school now being conducted by Chrysler Corp. in the Dodge plant.



Dominion's War Orders Average $2 Millions Daily

Toronto

• • • **The Department of Munitions** and Supply, headed by C. D. Howe, is maintaining its high rate of placing contracts for war supplies, construction projects in connection with the British Empire Air Training plant and industrial plant expanson, and other war undertakings. For some time past contracts averaging better than $2,000,000 per day have been awarded on behalf of the Canadian government with additional large sums for British account. During the past week contracts awarded totaled approximately $11,000,000 of which construction work was upwards of $2,500,000.

This sustained outflow of new business from the Canadian and British governments is reflected in steadily increasing demands for iron and steel and their products and primary producers of steel as well as the secondary plants are running to capacity. In addition a great many companies, engaged in war production or with war contracts in view, are building large extensions to their plants and are being assisted in these undertakings by government financing.

While industries producing war materials have first call on the Canadian steel mills and are taking deliveries of various materials on a broad scale, demand for finished and semi-finished steel for ordinary peace time production is growing in volume. Specifications are being prepared for steel by the automotive industry and it is stated that this tonnage will be further augmented this year through the establishments of new motor car plants in this country and increased production of present plants to provide war vehicles as well as motor cars to replace large imports from the United States that have been severely affected in price by the new war taxes.

Studebaker Corp. is establishing a plant at Walkerville for production of cars for the Canadian trade, while both Ford Motor Co. of Canada and General Motors

DoALL BAND SAWS MEET AMERICA'S ORDER FOR SPEED

Not only the speediest saws ever designed, but the cleanest cutting. CHIPS TELL THE STORY

DEVELOPED FOR USE ON THE DOALL CONTOUR MACHINE, THE WORLD'S FASTEST PRECISION SHAPE CUTTING MACHINE TOOL

There's a DoAll Band Saw for every kind of metal regardless of toughness, ductility and hardness. Send for interesting research booklet on such metals as:

Laminated Low Carbon Steel Sheets
Cold Rolled Nickel
Very Ductile Aluminum Alloy
Roller Bearings
4" thick Cast Brass
3/16" Neoprene Sheets
3" Cast Iron
Laminated Bakelite Strips
S.A.E. 3150 heat treated to 33-39 C Rockwell
Semi-steel Castings
Grade "C" Piping

Poor Chips from other saws.

Curled, Clean DoAll Cuttings

DO SAWS ALL

DoAll Saws come in the convenient "Stripit" cartons, originated by DoAll

Take advantage of our Free Offer to make tests on any tough sawing job.

Stocks and Service everywhere. Consult your phone book or write us.

IA-8

☐ Send booklet "Actual Performance Records of DoAll Saws"
☐ Send details of Free Saw Test offer

Name .....
Address .....

DOALL SAWS
(Division Continental Machines, Inc.)
DES PLAINES, ILL.

Corp. of Canada, are spending some $10,000,000 on plant additions in Canada. Taxes which range up to 80 per cent on the higher priced cars, make importation of these almost prohibitive, while at the same time the Foreign Exchange Board is making it increasingly more difficult to obtain United States funds or send Canadian funds out of the country for purchase of goods other than those required for war purposes.

Imports of iron and steel from the United States continue in increasing volume. These imports, however, mostly are to augment the Canadian supply for war production needs and as such enter Canada duty free or with 100 per cent drawback. Machine tools and equipment also enjoy similar privilege. Heavy purchases of tools and machinery have been made across the border recently and several millions of dollars in new orders are pending.

Canadian General Electric Co., which recently completed large addition to its plant at Peterborough, Ont., and is now engaged in further plant extensions, have received a large order, estimated at $10,000,000, for precision equipment for a wide range of artillery from the Department of Munitions and Supply. This new order calls for further plant expansion and the installation of tools and machinery.

The plant of the Montreal Dry Dock Co. at Montreal, which was destroyed by fire several months ago will be rebuilt immediately, the contract having been awarded to James W. Ross, Montreal, while other trades will be placed immediately. Montreal Dry Dock Co. is a subsidiary of Canadian Vickers, Ltd. J. Cecil McDougall is architect and engineer.

For the week ending Aug. 17 the Department of Munitions and Supply, Ottawa, placed 1753 orders. The more important being as follows:

Naval Supplies—Canadian Locomotive Co., Ltd., Kingston, Ont., $39,136; Dominion Chain Co., Ltd., Niagara Falls, Ont., $25,000.

Mechanical transport — Crane Limited, Ottawa, Ottawa, $72,192; W. D. Beath & Son, Ltd., Toronto, $40,662; Massey-Harris Co., Ltd., Toronto, $33,885; Canadian Top & Body Corp., Ltd., Tilbury, Ont., $184,806; Brantford Coach & Body, Ltd., Brantford, Ont., $33,885; Cockshutt Plow Co., Ltd., Brantford, $80,262; Gotfredson Limited, Walkerville, Ont., $38,750; Gar Wood Industries of Canada, Ltd., Windsor, Ont., $123,232.

Munitions and ordnance—Railway & Power Engineering Corp., Ltd., Toronto, $29,050; Hugh Carson Co. Ltd., Ottawa, $27,500.

$26,740,000 Bridge is Planned in Michigan

• • • Immediate steps to build a mile-long causeway extending south from the Upper Peninsula shore of Michigan, and part way across the Straits of Mackinac, are being planned by Michigan State highway engineers, following the recent Congressional approval of a bridge across the Straits linking Upper and Lower Michigan. Late in July the Mackinac Straits Bridge Authority reported that spanning the Straits is feasible. The proposed bridge would have a span of 4600 ft., the longest clear span in the world, and would extend from a point near the entrance to Fort Michilimackinac near Mackinaw City to a point south of St. Ignace, a distance of four miles and 1263 ft. The causeway would shorten somewhat the over-water distance and would serve meanwhile to reduce the length of the ferry trip across the Straits from the present nine miles to three miles. The estimated cost of the proposed four-mile bridge is $26,740,000. The causeway project is estimated at $1,215,000.

G-E Awarded $570,159 Order for Transformers

Washington

• • • **The Department of** the Interior has awarded a contract at $570,159 to the General Electric Co., Schenectady, N. Y., for six additional transformers for the initial power installation at the Grand Coulee Dam, Columbia Basin project, Washington.

the practical side of Springmaking — BY DUNBAR

What about WIRE FORMS?

1 2 3

Watch your loops—Nos. 2 and 3 at left are generally less expensive than No. 1.

*

Much care should be used to select proper material—round, square or rolled wire.

*

In specifications, direction of action should be shown.

*

Experience, not formulas, is the best qualification for wire form manufacture.

"Nothing on our mind but Springs"

FOR REAL, COMMON-SENSE HELP, CALL ON

Dunbar Bros. Co.

DIVISION OF ASSOCIATED SPRING CORPORATION

BRISTOL, CONNECTICUT

"Quality Springs Since 1845"

$6,000,000 Shell-Loading Plant Planned for Cleveland Area

• • • **The Government proposes** to build a $6,000,000 shell-loading plant employing several thousand workers six miles east of Ravenna in Portage County, according to word received here.

The proposed plant, about 39 miles from Cleveland, will be the second major government undertaking in expanding munitions manufacture. The first is a $25,000,000 power plant to be built at Charleston, Ind., and operated by the du Pont Co.

The proposed plant would be part of a $108,000,000 program for 18 loading plants with another to be built in southern Ohio. They would load chiefly 75 mm. and 155 mm. shells. Cost of tools and equipment would total approximately $33,000,000.

German Diesel-Electric Trains Shown in Chile

Washington

• • • **Six diesel-electric** trains made in Germany, delivered in Chile early in May and now on display in Santiago, are described in a report to the Commerce Department as attracting "considerable public interest."

The German equipment, part of an original $3,273,397 order placed by Chile in December, 1937, for 16 articulated trains, three locomotives and other electric equipment, was shipped via Genoa on a Norwegian steamer after urgent representations had been made to the Allies by the Chilean government.

1585 Workers Get Jobs In Wisconsin in July

Milwaukee

• • • **Industrial new employment** increased during the month of July, according to a recent report from the Wisconsin state employment service which shows marked increases in the heavy machinery, machine tool, textile and food industries. A total of 1585 placements were made and all but 81 were in private employment. The active list of job seekers, however, totaled 36,574 at the end of the month, a decline of 1970 from the previous month.

Out for a Quiet Cruise

PRECISION LANDIS GRINDERS

★ In a boat that glides smoothly and swiftly along. The pleasure of boating under such efficient power often causes us to forget the motor and its intricate mechanisms that make all this possible.

Yet underneath the streamlined hood are many reasons why this motor runs so powerfully and yet so smoothly. For every moving part quietly whispers, "accuracy—precision." Each is a working example of the quality that helps make the motor so efficient.

Illustrated is a Landis 10" x 16" Type D Hydraulic Crank Pin Grinder in operation in the plant of Evinrude Motors, where such a large number of the country's outboard motors are made. It is quietly contributing to the manufacture of a better product; therefore a more saleable, more profitable product.

LANDIS TOOL CO. • WAYNESBORO, PA.

No. 340

Mechanized War Places Steel In First Line Of Country's Defense

Cleveland — *R. J. Wysor*

• • • **The steel industry today** is in the first line of national defense and has an obligation to the entire nation, R. J. Wysor, president, Republic Steel Corp., says in an article in the current issue of "Republic Reports."

Mr. Wysor emphasized the importance of the steel industry to national preparedness in urging Republic workers to regard themselves in the first line of defense.

"The present European conflict," he said, "has made one fact unmistakably evident—war today is a mechanized undertaking fought through the medium of machinery. It is no longer a battle between men—it is a battle of machines.

"Without steel there can be no ships, no planes, no tanks, no scout cars, no artillery, no machine guns or rifles, no ammunition. Without steel in quantity and of high quality, defense plans bog down in their very inception.

"With these facts before us, the position of the steel industry and its obligation to every citizen in the country is self-evident.

"The industry is no longer merely a producer of steel. It is today in the first line of defense. From its furnaces and mills comes the material from which all armament is fabricated. Without a steady flow of iron and steel in all its shapes and analyses, the companies which make the ships, the tanks and planes may as well close their doors.

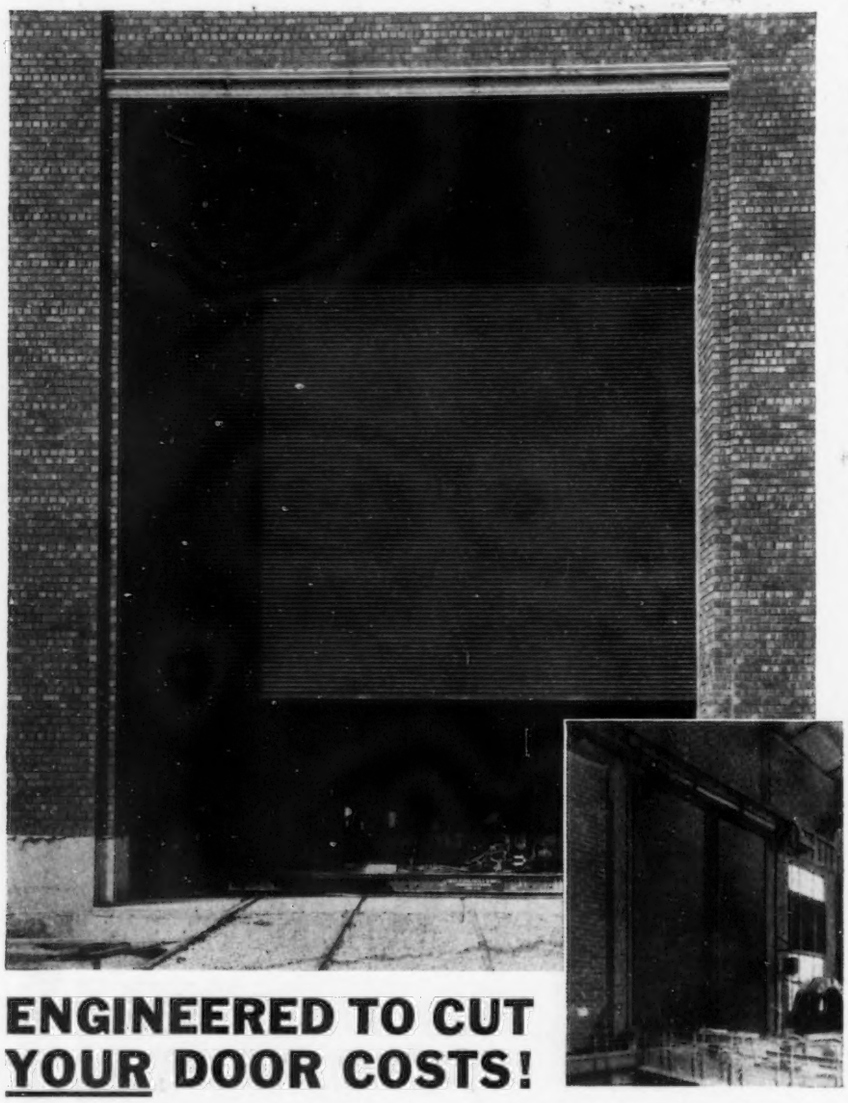
"Every steel man in the country must consider himself not only as a maker of steel, but more important, as a worker in the very front lines of national defense.

"We in Republic have an extra responsibility. Not only are we a part of the country's third largest steel company, making many kinds of common steel, but our company also produces in large volume the vital alloy steels so essential in every phase of rearmament.

"Each one of us is therefore under a distinct obligation not only to himself and his company but to the nation as a whole to help produce more steel and better steel than has ever before come from our mills.

"Each moment of delay, every unnecessary, inefficient motion, every lapse in our fight for high quality, may leave its imprint on our country's defense.

"Not only must every employee guard against inefficiency and waste but he must also be vigilant to guard the company against some of the destructive elements which were such a serious factor in the industrial organization of other nations."



ENGINEERED TO CUT YOUR DOOR COSTS!

That's one of the major reasons for the unbeatable economy of Kinnear Rolling Doors. For in addition to the basic advantages of Kinnear's rugged, all-steel construction and efficient, space saving operation, every door is engineered to meet the exact requirements of the individual opening. So whether for giant openings like the above (870 square feet!) or for average-sized openings, Kinnear Rolling Doors will help cut plant costs in numerous ways. Get the full story on door economy in the Kinnear Catalog. Write! The Kinnear Manufacturing Company, 1760-80 Fields Ave., Columbus, Ohio.

KINNEAR ROLLING DOORS

10 Advertising Clinics To Study Marketing Problems

Detroit

• • • **Marketing problems of** industry will be threshed out at 10 3-hr. clinics which will be staged at Hotel Statler, Detroit, during the three-day conference of the National Industrial Advertisers Association, Sept. 18-20. Demands of NIAA members throughout the country for more time at annual meetings for serious discussions of basic advertising topics and marketing aids brought about the scheduling of these sessions as the backbone of the entire conference program, according to the program chairman, Phillip Ruprecht, McGraw-Hill Publishing Co., General Motors Bldg., Detroit.

The clinics will supplement two general sessions at which NIAA members, guests from affiliate advertising organizations and business executives will study industry-wide advertising problems, especially those which have gained importance since the acceleration of national defense plans.

Oldsmobile To Turn Out 22 Models In Coming Year

Detroit

• • • **The Oldsmobile division of** General Motors Corp. has resumed production and assembly of automobiles at the Olds Motor Works, Lansing. The production departments in the plant have been working on 1941 parts for several weeks. For the coming year Olds will turn out 22 models, the largest number in the history of the company, according to C. L. McCuen, general manager, who recently was named vice-president in charge of G. M. engineering but has not yet assumed the post. Oldsmobile is the third General Motors division to get into new model production, Buick and Pontiac having previously announced the start of 1941 runs.

It is anticipated that the Plymouth Division of Chrysler Corp. will be in production of new models very shortly, having moved up its preview date to this week to expedite movement of new cars into dealers' hands. Plymouth will be the first of the Chrysler line to be announced.

UNITED STATES EXPORTS OF MACHINE TOOLS BY CHIEF COUNTRIES

FIVE MONTHS, 1940

England	France	Allied Percentage of World	Russia	Japan	Russia and Japan Percentage of World	World Total
$25,546,883	$22,317,324	64	$7,625,245	$9,865,369	25	$73,400,401
CALENDAR YEAR, 1939						
$25,569,745	$17,103,756	46	$15,414,268	$19,811,526	38	$93,403,772
CALENDAR YEAR, 1938						
$10,379,875	$5,047,225	21	$26,161,558	$19,412,824	61	$74,670,338

*Bureau of Foreign and Domestic Commerce.

FOR REAL PROTECTION...

ROLL-NECK bearings and reduction gears cost plenty. Steel mills need really *dependable* lubricants to safeguard such machinery against friction. Most of the continuous and 4-high mills have found the right answer in Penola. These tough, clingy lubricants have handled steel's biggest, meanest jobs with ease. They can do a great job in *your* mill, too. Ask a Penola Engineer to show you how it's done!

PENOLA LUBRICANTS
Penola Inc., Pittsburgh, Pa.
(Formerly Pennsylvania Lubricating Co.)
New York • Chicago • Detroit • St. Louis

LUBRICANTS FOR THE STEEL INDUSTRY SINCE 1885

STEEL COMPANY EARNINGS IN FIRST HALF UNDER LIKE 1939 PERIOD

• • • **A decline of 13 per** cent in the net income of the steel industry in the first half of 1940, compared with the last half of 1939, is indicated by reports from 80 steel companies.

Return on capital investment in the industry in the first six months of the current year was 2.9 per cent. In the last half of 1939 the return was 3.2 per cent.

In the period ended June 30, 1940, these companies, according to the American Iron and Steel Institute, had aggregate net income of $99,780,000 after all charges before dividends, compared with $114,940,000 after similar charges in the preceding six months. In the first half of 1939, with operations at a poor level, net income was $25,450,000.

If the rate of earnings of the first six months is continued for the full year the return on invested capital for 1940 will be about 5.7 per cent. That would be smaller than the return on investment in 1937 which was 6.2 per cent but larger than the return in 1938 or in 1939 which were 0.5 per cent and 4.2 per cent respectively.

In 1929, the steel industry's peak year for production, earnings of companies in the industry were equivalent to a return of 9.1 per cent on investment. Over the decade 1931-1940, earnings are expected to average only 2 per cent. Aggregate investment of the industry is about $4,200,000,000.

Taxes paid by the industry to federal, state and local governments reached a total of more than $78,000,000 during the half-year against $55,000,000 in the first half of last year.

Steel Industry's By-Products Valued at $125,000,000

• • • **By-Products valued** at approximately $125,000,000 were produced by the steel industry during 1939 from the manufacture of coke for blast furnace fuel, according to the American Iron and Steel Institute. Gas, tar, crude light oils and chemicals were the principal by-products obtained; part of the yield was consumed by the industry and the rest sold.

More than 510 billion cu. ft. of gas, valued at $76,500,000 were produced during the year. Some of the 409 million gal. of tar produced was used for open hearth furnace fuel, and the remainder was sold. A total of nearly 125 million gallons of crude light oil was obtained, much of this oil was refined in the industry's by-produst plants to produce over $13,400,000 worth of benzol, toluol and naphtha.

Among the other chemical by-products recovered from the coking process were about $9,800,000 worth of ammonium sulphate and ammonia liquor.

Powder Plant, Planes Ordered for Army

Washington

• • • **Contracts aggregating** $25,452,335 for the purchase of 56 bombing and 504 training planes and $25,000,000 for construction of a powder plant were announced last week by the War Department. Contracts were awarded these companies:

Consolidated Aircraft Corp., San Diego, Cal., 56 four-engine bombers, $14,861,342.

Fairchild Engine & Airplane Corp., Hagerstown, Md., 100 training planes, $1,038,000.

Beech Aircraft Corp., Wichita, Kan., 67 training airplanes, $3,410,746.

Stearman Aircraft Division, Boeing Airplane Co., Wichita, Kan., 337 training airplanes, $2,041,947.

Hercules Powder Co., $25,000,000 for the construction of a smokeless powder plant near Radford, Va., about 44 miles west of Roanoke, to be operated on a fixed fee basis with title to remain in the Government.

New Aircraft Companies Are Formed at Dayton

Dayton, Ohio

• • • **Headquarters of the** Cornelius-Hoepli Corp., aeronautical engineering firm, have been established here. George Cornelius is president of the company, which has taken temporary quarters with the Johnson Tool & Engineering Co. on Tulsa Lane.

New incorporations here in the aircraft field include Instrument Design Inc., to do research on electrical indicating instruments; Ohio Aera Accessories Inc., aeronautical engineering and sales services company which expects to be in production later, and Flight Control Equipment Corp., which will construct high frequency radio markers for airport runways.

Aeroproducts division of General Motors Corp. is erecting a new test building. Apex Machine & Tool Co. is erecting a new $100,000 building here.

E. J. Noble Quits Commerce Department to Aid Willkie

Washington

• • • **No believer in** the indispensability of Franklin D. Roosevelt, and feeling that election of Wendell L. Willkie as President is necessary in the interest of national defense and of economic recovery, Edward J. Noble, a lifelong Republican, has resigned as Under Secretary of Commerce. Mr. Noble formerly was president of Life Savers, Inc.

"In resigning my government post I told President Roosevelt that I felt could be really helpful in the field of national defense," Mr. Noble said. "My intention to do all that I can to insure the election of Mr. Willkie is a part of that program.

THESE two tanks in the plant of Carnegie-Illinois Steel Corp., Duquesne, Pa., were lined with two courses of acid-proof brick laid entirely in Penchlor Acid-Proof Cement.* They are used for pickling steel bars where the mechanical as well as the chemical action is especially severe.

Due to their large size—45′ x 5′ x 4′—both tanks were built with expansion joints in their lining. Inspection after a year's constant use showed absolutely no signs of permanent expansion of the lining. Both bricks and cement are still in perfect condition.

This is typical of the way Penchlor Acid-Proof Cement stands up in tough service. It is inert to all acids except hydrofluoric. It adheres strongly to such materials as brick, steel, glass, carbon, lead, and rubber. Quick-setting and self-hardening, it speeds up acid-proof construction.

For extremely abrasive conditions, or where thermal shocks are extreme, Asplit Cement* provides utmost durability and prevents spalling of bricks. It is a synthetic resin that far outlasts other types of acid-proof construction.

Pennsylvania Salt Mfg. Co., Widener Bldg., Phila., Pa.—New York • Chicago • St. Louis • Pittsburgh • Tacoma • Wyandotte.

Write for FREE TEST KIT. You can prove the outstanding properties of these acid-proof cements for yourself, and make a convincing comparison with the product you are now using, by means of the free Test Kit supplied on request. Write us today on your business letterhead.

*Fully protected by *existing* patents.

PENNSYLVANIA SALT MANUFACTURING COMPANY

Chemicals

Defense Projects Pushed at Detroit

Detroit

• • • **Impending orders for** machine tools, parts for tanks and airplane engines, and aircraft engine accessories have moved a step nearer to realization with announcements made in Washington during the last week that two major defense projects had been given official "go ahead" signals. One other major project, although tied in red tape for many weeks, may clear obstructions and get underway next month, it is indicated.

Status of some of the most important defense contracts in the Detroit area is as follows:

Chrysler Tanks—Purchase of a 113-acre site in Warren township, Macomb county, on Van Dyke Road between Eleven and Twelve Mile Roads was confirmed to THE IRON AGE Monday. This site, which is north and east of the mammoth new Dodge truck plant, is on the outskirts of Detroit. A $20,000,000 plant will be erected by the War Department for production of an initial $33,500,000 order for army tanks, principally in the 25-30 ton class. This is the largest defense expenditure allocated to Michigan.

Preliminary sketches of the factory, which is to have 800,000 sq. ft. of floor area are being prepared by Albert Kahn, Inc.

General Motors—Continued activity of the General Motors diesel division is being directed at the perfection of a tank engine. It is known that one diesel of approximately 300 hp. has already been tested with tank application in mind.

Ford—Without an actual formal contract, an agreement has been reached between the Ford Motor Co. and Dr. George Jackson Mead, aeronautical engine expert attached to the National Defense Advisory Commission. According to a Ford spokesman, terms have been established which give the "go ahead" signal to build slightly more than 4000 Pratt & Whitney 18-cylinder air cooled, double bank Wasp engines, rated at 2000 hp. each and intended for use in bombers. A new plant will be erected at the present River Rouge site of Ford Motor Co.

War Department Plans Depot at Ogden, Utah

Washington

• • • **Warehouses, administrative** operating buildings, utilities and railroad facilities will be constructed on a site of 1617 acres near Ogden, Utah, obtained by the War Department for the establishment of the Utah general depot. Quartermaster General Edmund L. Gregory said that $1,665,000 is now available to start construction but that $4,500,000 additional funds will be required for the program.

STAY AHEAD OF COMPETITION . . use more FORGINGS

● Makers of Gravely Tractor Mowers, used by golf courses and country estates, use forged connecting rods and four forged guards on the sickle mower, all of which give stamina, dependability, and long life to this unit.

● Makers of Handy "Servo" Universal Governors cite ease of machining, strength, and uniformity of physical properties of forged operating parts, weight carrier, weights, and lever contained in this precision made device.

THERE ARE NO SUBSTITUTES FOR FORGINGS

● "All-In-One" Airtemp Air Conditioner embodies this forged crankshaft to provide high fatigue resistance in compresser unit.

"Drop Forging Topics" gives actual information about the application of forgings in the manufacture of a wide range of equipment. It is published particularly for engineers and designers, metallurgists, production and management executives. If you are not already receiving it, write today. It's free.

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Steel Institute Forms Specifications Board

• • • **A Special Committee** on Government Specifications to assist government buying agencies in interpreting specifications of steel products was set up this week by the American Iron and Steel Institute through its board of directors as a step in expediting national defense work.

The five members of the committee are E. C. Smith, chief metallurgist, Republic Steel Corp.; V. H. Lawrence, assistant to vice-president, Alan Wood Steel Co.; P. E. McKinney, metallurgical engineer, Bethlehem Steel Co.; J. S. Richards, manager, metallurgical department, American Steel & Wire Co., and E. C. Wright, chief metallurgist, National Tube Co.

Since many existing specifications used by government departments are regarded as out of date, the new specifications committee is expected to bring government buying of steel into closer alinement with commercial practice.

Continuous Strip and Impact Casting Machines

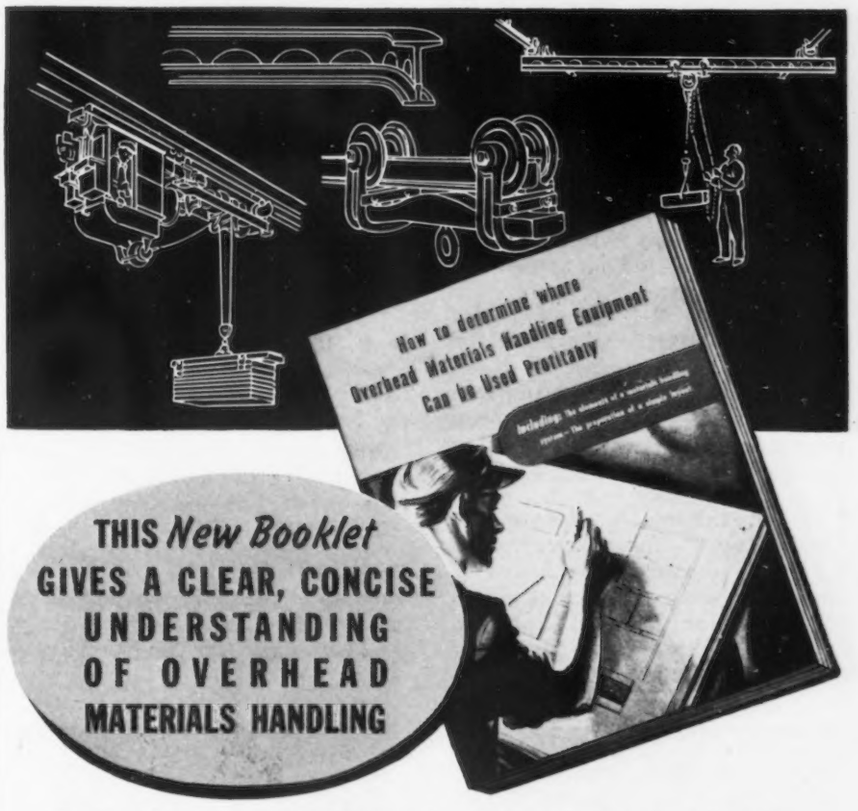
• • • **A four-page folder** has just been issued by J. M. Merle, metallurgical engineer, 9641 S. Oakley Ave., Chicago, describing machines for "propelling molten metal (ferrous or non-ferrous), super-cooled, degased and impact cast into sand molds; impact formed into metal molds or dies; or directly rolled into continuous metal strip." The folder sketches the construction of the machines and goes into detail as to the metallurgical phases of the various operations. Certain phases of the strip casting machine have previously been touched upon in THE IRON AGE, issue of April 11.

13½% of Steel Workers Are Salaried

• • • **For every thousand** wage earners working in steel plants during 1939, according to the American Iron and Steel Institute, there were about 135 salaried employees. Of that number, 55 were in administrative sales and general offices and 80 were out in the plants as supervisors.

Defense Tied to Labor Relations, Hook Says

• • • **Ability of the** United States to defend itself depends to a large extent on improved employment relations, Charles R. Hook, president of American Rolling Mill Co., said this week in an address at Burlington, Vt. The country needs the utmost production of vital materials in the shortest possible time, he said, a need which cannot be filled merely by turning a switch. Friction and misunderstanding between industrial management and men is like sand in the bearings, cutting down the quality and quantity of production, Mr. Hook said. He spoke before the Institute on Employment Relations.



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Personals

Change is inevitable in progressive Industry. Change is constant.

• **Herman J. Hofmann,** who has been assistant open hearth superintendent of Lukens Steel Co. since April, 1926, has been appointed open hearth superintendent to succeed J. D. Walters, who has resigned. Before joining the Lukens organization, Mr. Hofmann was identified with the Donner Steel Co. and the Carnegie-Illinois Steel Corp.

• **F. R. Faber,** who has been sales manager and secretary of the Despatch Oven Co., has been elected vice-president, retaining his position of sales manager. **G. C. Keyes** becomes vice-president and chief engineer and **G. M. Lund,** secretary and comptroller.

• **Floyd Stroup** has been appointed superintendent of the melt department of Copperweld Steel Co.'s new plant at Warren, Ohio. He was previously connected with American Steel Foundries and Central Alloy Steel Co.

• **Don H. Potter** has been elected secretary and treasurer of E. C. Atkins & Co. to succeed the late Fred C. Gardner. He has been associated with the E. C. Atkins Co. for over 25 years.

• **Major M. Poole,** heretofore purchasing agent for the company, has been elected to the board of directors. Both men are members of the Atkins Pioneer Club and have been active in all phases of factory production.

• **Conrad M. Wallin** has been appointed planning director of Cleveland Pneumatic Tool Co., Cleveland. He comes from Cleveland Tractor Co., where he served in similar capacity.

• **R. K. Mitchell,** who was with Cleveland Tractor Co. for ten years, is now works manager at A. W. Hecker Co., Cleveland machine shop. Daniel Martin, formerly with Cleveland Tractor, is now production foreman at A. W. Hecker Co.

• **John D. Baldwin, Jr.,** has been appointed resident engineer of the aircraft division of Weatherhead Co., Cleveland, for the Los Angeles area.

• **Russell De Young** has been appointed assistant to the president of Goodyear Aircraft Corp. and of Goodyear Foreign Operations, Inc.

• **Harry F. Davis,** former Detroit manufacturers agent, has been appointed sales manager of the Dycast Products Division of Monarch Aluminum Mfg. Co., Cleveland.

• **Edwin J. Thomas** will become president of Goodyear Tire & Rubber Co., Akron, Ohio, Sept. 1, succeeding P. W. Litchfield, who will continue as chairman. Mr. Thomas joined the company 24 years ago and became executive vice-president in 1938.

• **L. H. Grutsch,** formerly with International Harvester Co., is now works manager of Cleveland Tractor Co., Cleveland.

• **Elmer E. Legge** has been appointed assistant director of research for American Steel & Wire Co. at Cleveland and Leonard F. Peskin has been appointed technical engineer. Both men are transferred from Worcester, Mass., where Mr. Legge was district director of research for the company and Mr. Peskin was engineer in charge of transmission.

In addition to the appointments of H. H. Lumley and B. E. Pheneger, announced last week, American Steel & Wire Co. has appointed H. A. Byrns, Duluth blast furnace superintendent, as general super-

D. H. POTTER, secretary and treasurer, E. C. Atkins & Co.

M. M. POOLE, member of the board of directors of the Atkins company.

ELMER E. LEGGE, assistant director of research, American Steel & Wire Co.

intendent of the Cleveland coke works and Central furnaces and docks. J. A. Gates has been made superintendent of Central furnaces and docks. J. C. Witherspoon, assistant general superintendent at Donora, becomes general superintendent at Duluth. Harold Cope succeeds Mr. Witherspoon at Donora. H. O. Johnson succeeds Mr. Cope as superintendent of Donora blast furnaces and H. B. Burke becomes general foreman of that department.

• **Derick S. Hartshorn, Jr.,** has been named technical director of the Enthone Co. He will supervise development of new products and do sales engineering work. Mr. Hartshorn is a graduate of the University of North Carolina and for the past seven years has been associated with the Westinghouse Electric & Mfg. Co. He continues as director of the New England Control Laboratories whose facilities will be merged with those of the Enthone company.

• **Grosvenor S. McKee,** production manager of Talon, Inc., Meadville, Pa., has been elected a director of the Hall Planetary Co., milling machine manufacturers of Philadelphia. Mr. McKee was elected a director of the Robeson Cutlery Co., Perry, N. Y., early this year.

• **C. H. Manion** has been elected vice-president in charge of operations, Follansbee Steel Corp., Pittsburgh. He formerly was chief engineer and will be succeeded by **William L. Barr** who was maintenance engineer.

O. W. BUENTING, who was elected vice-president in charge of manufacture at Westinghouse Air Brake Co., as announced in these columns last week.

Mr. Manion has been associated with the corporation since 1919, serving successively as designer, maintenance engineer, efficiency engineer, and operating engineer. Mr. Manion had previously been with Wheeling Can Co., Merchant & Evans Co., Tennessee Coal, Iron & Railroad Co., Whitaker Glessner Co., and Wheeling Mold & Foundry Co.

Mr. Barr has been with Follansbee since 1927, starting as a tracer and advancing through positions as detailer, designer, checker, chief draftsman and maintenance engineer.

• **Lieut. Henry M. Marshall** has been made resident inspector of naval materials in the Milwaukee area, succeeding Lieut. F. R. Stolz, who has been assigned to sea duty with the *Texas*. Lieut. Marshall heads a staff of 14 which has been checking materials being made in Milwaukee at the rate of $800,000 a month.

• **Ray A. McElhinney,** superintendent of Midwest Abrasive Co. since 1937, has been made production manager. Formerly he was with Chrysler Corp. for 10 years.

• **J. B. Fisher,** vice-president and chief engineer of the Waukesha Motor Co., Waukesha, Wis., has been made chairman of a committee by the Society of Automotive Engineers to study further means for standardizing trucks in the national defense program. He served on a similar committee during the World War. Interchanging of unit assemblies, parts and accessories also will be a part of the study.

• **Claire C. Balke** has rejoined the research staff of Fansteel Metal-

H. A. BYRNS, general superintendent of the Cleveland Coke Works & Central Furnaces & Docks, American Steel & Wire Co.

C. H. MANION, vice-president in charge of operations, Follansbee Steel Corp.

W. L. BARR, chief engineer of the Follansbee corporation.

lurgical Corp., North Chicago, Ill., to participate in important studies in the powder metallurgy of tantalum, tungsten, columbium, molybdenum, other metals, and refractory metal carbides. Mr. Balke is the son of Dr. C. W. Balke, well known authority on rare metals and earths, who has been associated with the Fansteel organization since 1914. The younger Balke joined Fansteel immediately after graduation from the University of Illinois and worked in the research laboratory until Aug. 1, 1939, when he became instrumental in the establishment of a department of powder metallurgy at Stevens Institute of Technology, Hoboken, N. J. Mr. Balke's return to Fansteel is part of a major program of technical development, plant expansion and equipment improvement, in which more than $100,000 is being expended in new buildings and equipment alone.

• **Harold Caminez** has been appointed executive engineer of Air Associates, Inc., Garden City, N. Y. Mr. Caminez was connected with Allison Engineering Co., Indianapolis, from 1929 to 1936 where he worked on the design and development of the V-1710 Allison engine. He also originated the Screw Thread System which was introduced recently by Air Associates, Inc.

• **Henry T. Heald,** president of Armour Institute of Technology for the past two years, has been elected president of the newly formed Illinois Institute of Technology. This new school is the product of a recent merger of Armour Institute of Technology and Lewis Institute of Technology. Mr. Heald, who is only 35 years old, received his engineering education at the State College of Washington and the University of Illinois. He has served as a bridge designer for the Illinois Central Railroad and as a structural engineer for the Chicago Municipalities Improvement Board. For four years he was identified with the Walter Bates Steel Co., Gary, and for irregular periods with the Louisville Bridge & Iron Co., Louisville, Ky.

• **C. F. Niemann, Jr.,** has been appointed assistant to the president of the Parkersburg Iron & Steel Co., Parkersburg, W. Va.

• **C. B. Pratt,** former general superintendent of the Rock Island Railroad, is retiring from railway service on Sept. 1 at the age of 67 years after 38 years with the Rock Island. **W. E. Heimerdinger,** district maintenance engineer at Des Moines, has been appointed superintendent at Fort Worth to succeed Mr. Pratt who has been stationed at that point for the past year.

Obituary

• • • **Walter P. Chrysler,** the automobile manufacturer, died Aug. 18 after an illness of several years. He was born in Wamego, Kan., in 1875 and started out in his first job as an apprentice in the Union Pacific Railroad shops. His first connection with the automotive industry was as plant manager of the Buick Motor Co. in 1911. He held executive positions with Buick, General Motors, Willys-Overland and Maxwell Motors before organizing the Chrysler Corp. which comprised the Maxwell, Chalmers and Dodge companies. He was president of the company until 1935 when he appointed K. T. Kellar to the post, but remained the company's chief executive as chairman of the board.

WALTER P. CHRYSLER, 65, above, one of America's great automobile builders, died Aug. 18 at his home in Great Neck, Long Island. His career ranged from sweeper in a Kansas City railroad shop to chairman of Chrysler Corp., which he organized.

• **Lawrence A. Downs,** chairman of the board of the Illinois Central Railroad, died last week in Chicago, aged 68 years. Mr. Downs had been chairman of the board since December, 1938, and prior to that time was president of the road for 12 years. Educated at Purdue University, Mr. Downs began railroading with the Vandalia road in Indiana, now a part of the Pennsylvania system, as a rod carrier in a surveying gang, going to the Illinois Central 18 months later for a similar job. From that time on his rise through the ranks of the Illinois Central system was rapid and in 1915 he was advanced to general superintendent of the Southern lines with headquarters in New Orleans. The next year he returned to Chicago as general superintendent of the Northern lines. In 1919 he was promoted to assistant general manager or operations chief of the entire Illinois Central system. The following year he was elected vice president and general manager of the Central of Georgia, an Illinois Central holding. On the retirement of C. H. Markham from the presidency, Mr. Downs was appointed to succeed him. Mr. Downs was a past president of the American Railway Engineering Association and a member of the American Society of Civil Engineers.

• **Charles Harold Owens,** secretary and treasurer of the Lynchburg (Va.) Foundry Co., was killed in an automobile accident near Lynchburg last Thursday. Mr. Owens was 45 years old.

• **Charles F. Fundaberg,** 36 years old, construction engineer for J. A. Utley Construction Co., died recently at Detroit. Mr. Fundaberg had lived in Detroit since being graduated from Denison University, Granville, Ohio, in 1926.

• **William A. Converse,** retired secretary and technical director of the Dearborn Chemical Co., Chicago, died last week. Mr. Converse was a member of the American Chemical Society and the doner of the Willard Gibbs medal, awarded annually to the outstanding American chemist. He was 77 years old.

Metal Working Activity

. . . Latest Data Assembled by The Iron Age

From Recognized Sources. In Net Tons.

	July 1940	June 1940	July 1939	7 Months 1940	7 Months 1939
Steel Ingots:					
Monthly output[a]	5,595,070	5,532,910	3,564,827	34,273,194	24,523,550
Average weekly output[a]	1,265,853	1,289,723	806,522	1,126,296	809,625
Per cent of capacity[a]	83.40	89.47	52.74	74.20	53.09
Pig Iron:					
Monthly output[b]	4,053,945	3,818,897	2,639,022	25,137,545	16,664,075
Raw Materials:					
Coke output[c]	.....	.....	3,411,099	.....	22,008,662
Lake Ore consumed[d]	.....	5,838,223	3,520,537	*30,612,586*	22,527,930
Scrap Iron consumed[r]	3,949,120	3,899,840	2,516,640	24,346,560	17,316,320
Castings:					
Malleable, orders[e]	.....	36,503	29,892	*218,425*	223,154
Steel, orders[e]	.....	59,661	34,804	*272,006*	264,960
Finished Steel:					
Trackwork shipments[a]	6,063	6,075	5,330	27,068	25,639
Fabricated shape orders[f]	.....	103,111	110,675	*600,474*	776,922
Fabricated plate orders[e]	.....	48,639	31,364	*220,323*	208,401
U. S. Steel Corp. shipments[g]	1,296,887	1,209,684	745,364	7,585,285	5,583,768
Fabricated Products:					
Automobile production[h]	225,000**	350,000**	209,359	2,658,892**	2,171,348
Steel furniture shipments[e]	.....	$2,159,626	$1,566,978	*$13,222,382*	$12,176,995
Steel boiler orders[e] (sq. ft.)	.....	1,740,127	772,094	*5,537,575*	6,011,187
Locomotives ordered[i]	51	31	4	236	156
Freight cars ordered[i]	5,846	4,235	0	16,431	9,077
Machine tool index[j]	88.3	92.3	65.8	92.3	60.5††
Foundry equipment index[k]	194.4	164.9	*	157.4	*
Gear sales index[s]	141.0	129.0	89.0	126.0††	92.0††
Non-Ferrous Metals: (U. S. only)					
Lead shipments[l]	.....	49,904	42,636	*268,723*	275,042
Lead stocks[l]	.....	55,343	124,017	.....	.....
Zinc shipments[m]	57,661	53,935	43,128	371,444	288,418
Zinc stocks[m]	59,510	65,227	131,782	.....	.....
Tin deliveries[n] (gross tons)	8,204	10,332	5,908	64,886	39,508
Refined copper deliveries[o]	71,226	61,716	59,681	490,093	357,092
Refined copper stocks[o]	215,823	199,586	316,543	.....	.....
Exports:					
Total iron and steel[p]	.....	1,048,373	575,304	*4,761,925*	3,612,998
All rolled and finished steel[p]	.....	351,550	148,596	*1,998,537*	1,025,212
Semi-finished steel[p]	.....	285,884	19,006	*865,685*	98,540
Scrap[p]	.....	356,573	391,416	*1,658,838*	2,389,297
Imports:					
Total iron and steel[p]	.....	6,166	34,553	*44,854*	232,786
Pig iron[p]	.....	720	6,932	*6,468*	24,688
All rolled and finished steel[p]	.....	1,117	16,172	*11,135*	134,232

Data in italics are six months' totals.

Source of data: [a] American Iron and Steel Institute; [b] The Iron Age; [c] Bureau of Mines; [d] Lake Superior Iron Ore Association; [e] Bureau of the Census; [f] American Institute of Steel Construction; [g] United States Steel Corp.; [h] Preliminary estimates by The Iron Age—Final figures from Bureau of the Census, U. S. only; [i] *Railway Age;* [j] National Machine Tool Builders Association; [k] Foundry Equipment Manufacturers Association; [l] American Bureau of Metal Statistics; [m] American Zinc Institute; [n] New York Commodity Exchange; [o] Copper Institute; [p] Department of Commerce; [r] Institute of Scrap Iron and Steel; [s] American Gear Manufacturers Association.

†Six months' average. ††Seven months' average. *Not available. **Estimate.

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

	Aug. 20 1940	Aug. 13 1940	July 23 1940	Aug. 22 1939
Flat Rolled Steel:				
(Cents Per Lb.)				
Hot rolled sheets	2.10	2.10	2.10	2.00
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.00
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Tin and Terne Plate:				
(Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes:				
(Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Wire and Wire Products:				
(Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.40
Rails:				
(Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel:				
(Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Wire Rods and Skelp				
(Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

	Aug. 20 1940	Aug. 13 1940	July 23 1940	Aug. 22 1939
Pig Iron:				
(Per Gross Ton)				
No. 2 fdy., Philadelphia	$24.84	$24.84	$24.84	$22.84
No. 2 Valley furnace	23.00	23.00	23.00	21.00
No. 2, Southern Cin'ti	23.06	23.06	23.06	21.06
No. 2, Birmingham	19.38	19.38	19.38	17.38
No. 2, foundry, Chicago†	23.00	23.00	23.00	21.00
Basic, del'd eastern Pa.	24.34	24.34	23.34	22.34
Basic, Valley furnace	22.50	22.50	22.50	20.50
Malleable, Chicago†	23.00	23.00	23.00	21.00
Malleable, Valley	23.00	23.00	23.00	21.00
L. S. Charcoal, Chicago	30.34	30.34	30.34	28.34
Ferromanganese	120.00	120.00	120.00	80.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

Scrap:				
(Per Gross Ton)				
Heavy melt'g steel, P'gh.	$18.75	$18.50	$18.50	$16.25
Heavy melt'g steel, Phila.	19.75	19.50	18.75	16.25
Heavy melt'g steel, Ch'go	18.50	17.875	17.25	13.875
Carwheels, Chicago	18.75	18.25	19.00	12.75
Carwheels, Philadelphia	21.25	21.25	20.75	16.25
No. 1 cast, Pittsburgh	19.75	19.75	19.75	15.75
No. 1 cast, Philadelphia	21.75	21.25	21.25	16.75
No. 1 cast, Ch'go (net ton)	16.75	16.75	16.75	12.75
Coke, Connellsville:				
(Per Net Ton at Oven)				
Furnace coke, prompt	$4.75	$4.75	$4.25	$3.75
Foundry coke, prompt	5.25	5.25	5.25	4.75
Non-Ferrous Metals:				
(Cents per Lb. to Large Buyers)				
Copper, electro., Conn.*	11.00	11.00	11.50	10.50
Copper, Lake, New York	11.00	11.00	11.50	10.50
Tin (Straits), New York	51.375	51.375	51.125	48.65
Zinc, East St. Louis	6.50	6.25	6.25	4.75
Lead, St. Louis	4.60	4.60	4.85	4.90
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	14.00

*Mine producers only.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 104 to 110 herein.
On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Composite Prices

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Aug. 20, 1940	2.261c. a Lb.	$22.61 a Gross Ton	$19.00 a Gross Ton
One week ago	2.261c. a Lb.	$22.61 a Gross Ton	$18.63 a Gross Ton
One month ago	2.261c. a Lb.	$22.61 a Gross Ton	$18.17 a Gross Ton
One year ago	2.236c. a Lb.	$20.61 a Gross Ton	$15.46 a Gross Ton

	FINISHED STEEL High	FINISHED STEEL Low	PIG IRON High	PIG IRON Low	SCRAP STEEL High	SCRAP STEEL Low
1940	2.261c., Jan. 2	2.211c., Apr. 16			$19.92, June 18	$16.04, Apr. 9
1939	2.286c., Jan. 3	2.236c., May 16	$22.61, Sept. 19	$20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.512c., May 17	2.211c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.236c., May 28	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Summary of the Week

· Operations advance one point to 90½ as orders again turn upward . . . Scrap composite climbs 37c. to $19 . . . Steel Institute sets up specifications committee to aid Government agencies . . . Structural awards increase.

SOME companies which normally are not consumers of steel in any quantity are now entering the market for that metal, a development which indicates that the nation's defense program is making some progress, however slow, and that plants making peacetime products are gradually changing over to defense products.

Operations in the country's steel plants this week climbed a point to 90½ per cent as a result of stronger mill schedules at such points as Pittsburgh where ingot production rose three points to 84 per cent, Chicago, where output rose a point to 98 per cent, and Cleveland, where operations climbed two points to 86 per cent. The Youngstown, Detroit and Philadelphia districts report operations unchanged from last week. In virtually all districts steel producers are attempting to reach higher operating levels. One result of the straining for higher production is a move by some companies to encourage the wider use of Bessemer steel in tin mill products, piling and other items now made of open-hearth steel. Open-hearth capacity of some steel plants is already at full capacity.

STEEL buying the past week turned slightly upward, adding to backlogs which are topheavy for some products, but orders placed so far in August are running well behind the volume placed during the corresponding period of July. Orders for the first three weeks of August at Cleveland, for example, ran from 10 per cent to 12 per cent behind July. Some of the improvement in steel specifications seen in the last few days is coming from Detroit where automobile production is advancing sharply with output of 1941 cars started by Plymouth.

Another factor in the improvement is export purchases from Great Britain.

Tonnages ordered so far for national defense are not yet significant but steel producers report a slow and steady increase in the amount of steel being booked for such purposes. In order to facilitate Government buying, the American Iron & Steel Institute this week organized a five-man Special Committee of Government Specifications to assist Government agencies in interpreting steel specifications and bringing Federal purchasing of steel products closer into alinement with commercial practice.

EFFORTS to open another defense bottleneck were being made this week in the move to have Congress pass legislation enabling the Government to take over foreign-owned machine tools which, because of restrictions against their exportation, are being held at the docks or in the hands of American manufacturers. A substantial part of such machine tools required for defense needs is said to be those manufactured for Russia. Meanwhile a $54,500,000 contract with Chrysler Corp., involving construction of an estimated 1000 25-ton tanks, has been cleared by the National Defense Advisory Commission for the War Department and contracts have been awarded for a $25,000,000 smokeless powder plant in Virginia, and for more than 550 bombing and training planes valued at $25,452,335.

A general rise in prices of steel-making scrap has accompanied a quiet resumption of mill buying, with THE IRON AGE scrap composite advancing 37c. this week to $19, the highest point since the week of June 25, and 92c. below the year's high recorded in the week of June 18.

RAILWAY equipment buying in the past week was relatively light. The Rock Island has been authorized by the courts to purchase 800 box cars, 200 automobile cars and 100 gondolas. The Army is expected soon to issue bids on 150 to 600 tank cars and is experimenting with box cars capable of mounting anti-aircraft guns.

Structural steel awards for the week were 22,000 tons compared with 21,400 tons last week, the largest letting being 4000 tons for naval air bases in the Pacific Ocean. New structural projects jumped to 23,700 tons from 9425 tons a week ago, with sizable new inquiries including 8400 tons for the super-structure of the St. Georges Highway Bridge, St. Georges, Del., and 3000 tons for Navy Yard structures in Brooklyn.

Reinforcing steel lettings totaled 10,440 tons and covered 2000 tons for the Norfolk Navy Yard, 1000 tons for marine barracks at Paris Island, Ga., and 1000 tons for a powerhouse at Fort Peck, Mont.

The Industrial Pace . . .

A MODERATE RISE was recorded by THE IRON AGE index of durable goods output for the week ended Aug. 17, the first gain shown in four weeks. The improvement was due chiefly to the automobile index which rose four points as a major producer went into production on 1941 models. This gain in the automobile index to 21.0 culminates eight successive weeks of losses in which time the automobile series dropped from a high of 84.4 in the week of June 1 to a low of 21 for the week ended Aug. 10.

The rise in the automobile series, plus a gain of 1.7 points in the Pittsburgh index and 0.7 points in the construction component, resulted in advancing the combined index figure to 86.3, 2.2 points above the preceding week and highest since the week of June 29.

As the automobile component had been chiefly responsible for the weakness of the index over the past month, due to the model changeover period, and future prospects for the other factors remain bright, the index is likely to experience a period of sharp rises until "normal" automobile output is attained.

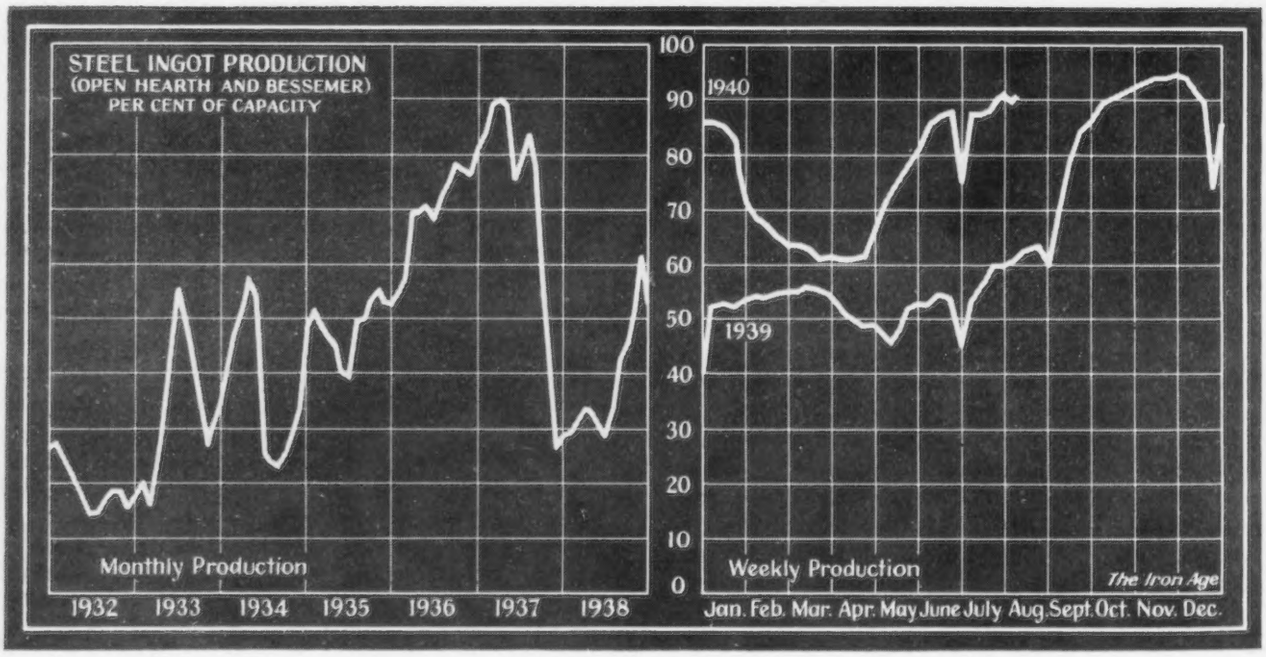
HEAVY ENGINEERING construction awards for the past week dropped 41 per cent from the previous week, the loss being due entirely to a 57 per cent drop in the volume of publicly financed work. Private work advanced 49 per cent over the preceding period. Despite the gain in private work and the drop in public work, public projects are the chief supporting factor of the heavy construction industry. In the past week private awards totaled $17,364,000, while volume of work underwritten with public money was $27,941,000.

The past week's decline in physical output of the steel industry has no particular significance. With an extended period of near-capacity operations in prospect, repairs to equipment, excessively hot weather, etc., will continue to cause minor changes, both up and down, to be recorded in production schedules.

SUPPORTING THIS view, is the new strength shown by scrap prices. After a decline lasting five weeks, set off by Italy's entry into the war, prices, as reflected by THE IRON AGE composite, reached a leveling off point on July 23 and remained unchanged for three weeks. The first rise was recorded in the past week. It is likely that the trend would have been reversed perhaps two weeks ago were it not for the temporary uncertainty injected into the market by the application of export restrictions.

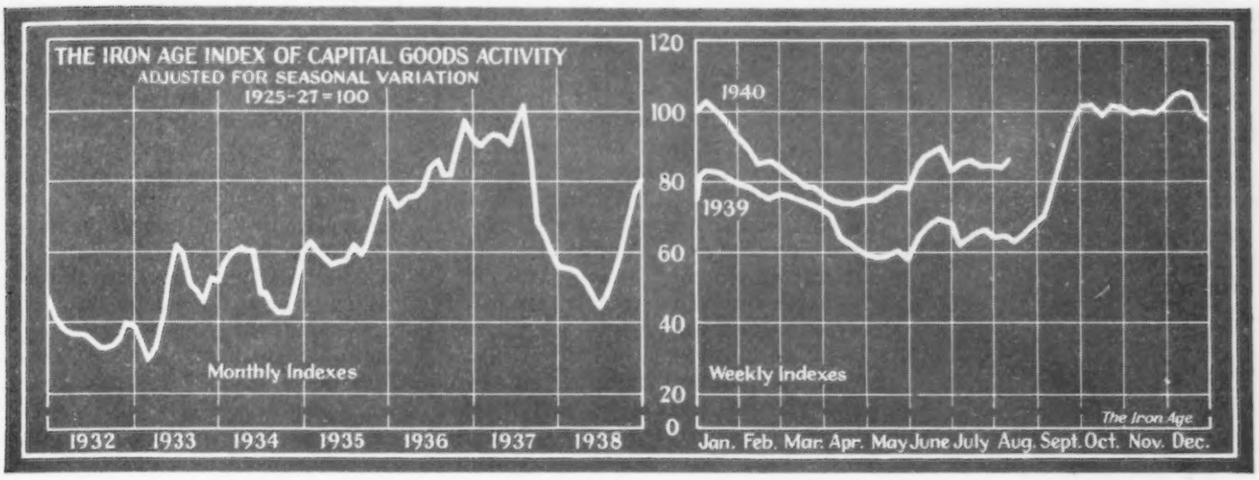
July shipments of finished steel by U. S. Steel Corp., at 1,296,887 tons, reached a new high for the current year, but were still substantially below the peak of the fall of 1939. The July shipments were at a rate equal to 79.2 per cent of the corporation's finishing capacity, as compared with 76.1 in the preceding month and 86.1 in November, 1939, the high-point of that year. This percentage figure takes into consideration the differences in the working period of each month and are probably a more accurate reflection of actual schedules than the tonnage figure.

Steel Output Gains to 90.5%—½ Point Below Year's High



District Ingot Production, Per Cent of Capacity		Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	West-ern	St. Louis	East-ern	Aggre-gate
	Current Week	84.0	98.0	90.0	93.0	86.0	100.5	105.0	95.5	93.0	89.0	63.0	91.0	75.0	**90.5**
	Previous Week	81.0	97.0	90.0	93.0	84.0	101.0	103.0	95.5	93.0	89.0	63.0	73.5	75.0	**89.5**

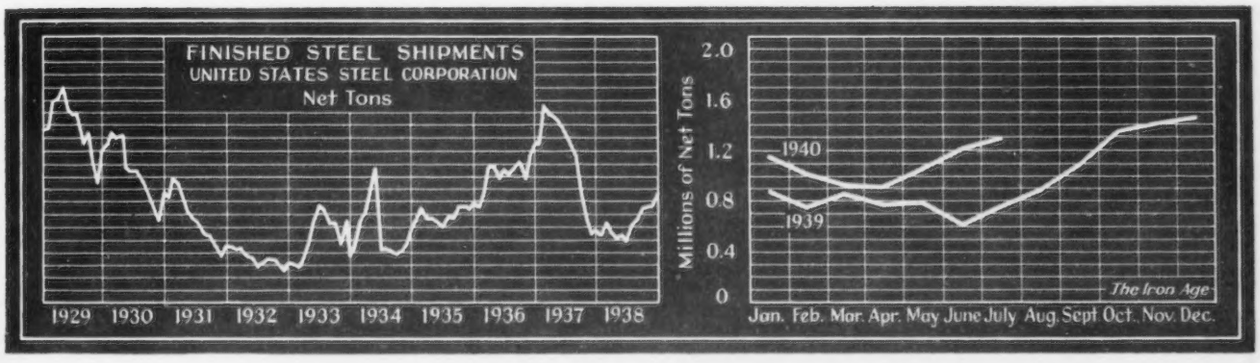
Index Higher as New Auto Model Production Begins



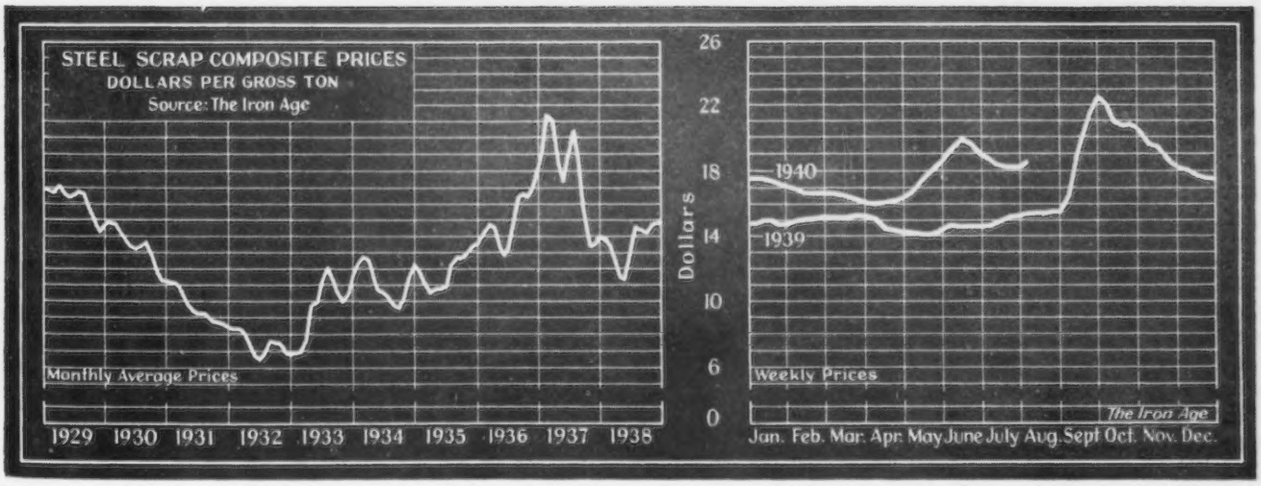
Component ▼ Week Ended ➤	Aug. 17	Aug. 10	July 20	Aug. 19 1939	Aug. 17 1929
Steel ingot production[1]	131.3	131.3	125.8	92.1	127.1
Automobile production[2]	25.0	21.0	53.5	19.6	117.4
Construction contracts[3]	91.0	90.3	82.9*	69.8	111.1
Forest products carloadings[4]	66.1	67.7	59.6	56.8	119.5
Pitts'gh output and shipments[5]	112.0	110.3	108.7	77.8	126.8
COMBINED INDEX	85.1	84.1	86.1*	63.2	120.4

Sources: [1] THE IRON AGE; [2] Wards Automotive Reports; [3] *Engineering News-Record;* [4] Association of American Railroads; [5] University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended Aug. 10. Other indexes cover week of Aug. 17. *Revised.

U. S. Steel Shipments at New 1940 High



Downward Trend of Scrap Prices Reversed



Market News

. . . THE WEEK'S ACTIVITIES IN IRON AND STEEL

New Business

. . . Automotive support increases specifications

Total steel specifications at PITTSBURGH in the past week improved moderately from the volume placed in the week before, some of the support emanating from automotive centers. The latter improved demand reflected a better volume of cold rolled sheet and bar specifications. Export purchases, especially from the British, were also a factor in the past week's buying. Although total orders booked at PITTSBURGH since the first of the month are less than the volume booked in the corresponding number of days in July, the gap is not as great as it was a week ago. Owing to industrial vacations, there appears to have been a slight contraction in the number of steel consumers ordering, but this reduction in diversification, however, has not resulted in a corresponding decline in tonnage. Although tonnages so far are not significant, PITTSBURGH steel makers note a slow but steady increase in the amount of steel being booked to be ultimately slated for national defense projects.

At CLEVELAND and YOUNGSTOWN orders for steel continue topheavy in some divisions, while other departments are rapidly depleting their backlogs. Aggregate orders up to Aug. 19 at CLEVELAND were about 12 per cent below the volume in the comparable part of July, but new tonnage compared favorably with shipments. Delivery promises on standard grades of tool steel are reported becoming more extended. Large armor plate awards expected this fall may tax new electric furnace capacity as soon as it is installed.

Construction projects over the nation, which involve an increasingly large proportion of private financing are providing much impetus for steel makers. British purchases are apt to increase rather than decrease because of effects of German bombing, in the opinion of many sellers at CLEVELAND.

New orders for the month to date at CHICAGO continue to run 20 to 25 per cent behind the corresponding period of July. In spite of this loss, orders are still about even with shipments at some mills and not far below at others. Some orders have been received recently from our own government for defense purposes, both directly and indirectly. It is expected as the defense program gets into high gear that the federal government will become one of the major steel consumers. Since the near-record operating rate in the CHICAGO district of the past few weeks has been attained without major support from the automobile and railroad industry, or the defense commission, what will happen to backlogs in the near future is obvious, since all three of these major consuming channels are expected to increase activities substantially over the next few months.

As the third quarter progresses, it is becoming apparent in CHICAGO that there will be no major changes either in the rate with which steel business is being received or in the operating rate over the balance of the year. Structural shapes and plates are among the most active products at CHICAGO this week. Demand for tin plate is receding because of large inventories at plants of can manufacturers. A general tendency to increase stock has been detected throughout the Middle West over the past few weeks. For a manufacturing plant to have on hand a 90 to 120 day supply of steel is not at all uncommon.

Substantial amounts of steel for Great Britain is in the figuring process in SOUTHERN OHIO district mill offices. This, combined with interest in the defense program commitments constitute the only new features in the district market currently. Demand generally is unabated in flat steel, whether from mills or warehouses. Metal working machinery continues to be aggressively active, while pig iron is unchanged.

Sales volume so far this month in the PHILADELPHIA district is running 15 per cent below to 10 per cent above last month's figures, with one large producer reporting a sharp improvement late this week. Although heavy products still predominate flat rolled activity is steadily increasing and automotive interests are contributing more and more to this volume. Inquiry has been made by the Picatinny Arsenal for 5000 tons of hot rolled sheets to be used in the manufacture of bomb crates. Additional support has been found in inquiries received from stove manufacturers.

Prices

. . . Early reaffirmation likely for fourth quarter

Some announcement is expected soon regarding fourth quarter prices, although the concensus in the trade is that present base quotations will be reaffirmed for fourth quarter delivery and that if any changes are made they will be minor adjustments and will probably involve the revisions of extras rather than any change in base prices.

Steel Operations

. . . National average advances a point to 90½ per cent

Gains in the largest steel producing districts this week lifted the industry's national average to 90½ per cent, up a point from last week and a half point below the year's high of 91 per cent, recorded in the first week of August.

The PITTSBURGH district has gained three points to 84 per cent, CHICAGO one point to 98 per cent, believed to be the highest rate ever recorded in that district, CLEVELAND two points to 86 per cent, WHEELING two points to 105 per cent, and the ST. LOUIS area 17½ points to 91. The PITTSBURGH area still is three points below its high for this year. Unchanged mill schedules were reported in the YOUNGSTOWN, DETROIT and PHILADELPHIA districts.

Pig Iron

. . . Producers cite higher costs in price discussion

Considerable interest in the pig iron market is centered on fourth quarter prices. While there has yet been no intimation of a possible increase, the view of some independent producers is that the rising costs of raw materials, particularly coke will necessitate an increase. Consumers generally are not endeavoring to cover against a possible increase, although some large users are stocking iron far in excess of normal requirements. In some cases, these inventories are already sufficient to carry operations well into the middle of 1941.

The British have made additional commitments with an Eastern producer. Total business placed by the British with this producer is in the neighborhood of 100,000 tons.

Shipments in the NEW YORK area recently have reflected a small seasonal gain in foundry melting operations and deliveries thus far this month are ahead of the comparable period of July. The gain was chiefly in jobbing operations. New orders are extremely light.

The volume of fresh business at PITTSBURGH is unimpressive but producers have substantial tonnages on the books, shipments continue at a high level and production is expected to be at capacity for the next few months at least. At CLEVELAND shipments have gained day by day since Aug. 5. The improvement seems to be general among consuming industries, with particularly good releases for basic iron. In early September a much heavier rate of foundry melt is expected. Canada continues to take steel making iron from the United States, which enables Canadian stacks to furnish merchant iron to the foundry trade.

Pig iron shipments at CHICAGO are increasing slightly and the month of August will probably show an increase over the previous month. Foundry coke shipments are also moving up, indicating greater activity on the part of the foundries in this district. Though there is apparently no serious shortage of blast furnace coke here at the present time, it is not unlikely that some tightness will be felt if additional furnaces are put into blast.

Releases on pig iron contracts in the SOUTHERN OHIO district continue to equal the peak month of June. New business is practically non-existent, since all melters were well covered early in the quarter. Foundry operations are in the neighborhood of 65 to 70 per cent, with machine tools still most active. Automotive melters are moving into better production, but stove foundries are still suffering from a slight recession.

Pig iron production in the BIRMINGHAM district for the week of Aug. 18 remains unchanged with all 18 blast furnaces in the district in blast. High furnace operations and heavy shipments continue in the PHILADELPHIA area on old orders.

Semi-Finished Steel

. . . Specifications expand, supply likely to tighten

Semi-finished steel specifications at PITTSBURGH have expanded some in the past week due to both domestic and foreign placements. If the present rate of operations continues, it is expected that semi-finished material will become much tighter than has been the case for several years. For some months past, many companies which not so long ago were able to sell semi-finished steel have been utilizing every bit of capacity for their own finishing mills. Demand from the British in the past week compares favorably with the rate of recent purchases. Aggregate August orders are running behind July at CLEVELAND, even though demand from forge shops has been gaining recently. Rod sellers have noted a sharp increase in activity by cold drawers during the past week, with considerable pressure being exerted for quick delivery.

Iron Ore

. . . July consumption largest for that month since 1929

Blast furnace consumption of Lake Superior iron ore last month at 5,493,961 gross tons was the largest since December, 1939, when 5,538,374 tons were used, and the best of any July since 1929, when consumption totaled 5,808,473 gross tons. In June, 5,212,699 tons were used. The report of the Lake Superior Iron Ore Association, Cleveland, shows cumulative consumption this year up to Aug. 1 at 32,826,627 tons, against 20, 114,223 tons in the comparable part of 1939.

There were 153 blast furnaces active July 31, according to the association. This compares with 148 one month earlier and 102 a year ago. Of the 36 stacks idle July 31, the majority cannot be considered available on short notice. Most of the available furnaces are in the Chicago district.

Ore on hand at Lake Erie docks and furnaces, Aug. 1, totaled 28,128,054 gross tons, against 23,515,802 tons at the previous monthly report and 28,507,243 tons a year earlier.

July Shipments of U. S. Steel at New High for 1940

Month	1936 Shipments	1936 Per Cent of Capacity*	1937 Shipments	1937 Per Cent of Capacity*	1938 Shipments	1938 Per Cent of Capacity*	1939 Shipments	1939 Per Cent of Capacity*	1940 Shipments	1940 Per Cent of Capacity*
January	795,214	44.8	1,268,403	75.4	570,264	33.7	870,866	51.8	1,145,592	69.8
February	747,375	45.3	1,252,845	82.5	522,395	35.5	747,427	49.3	1,009,256	65.8
March	863,946	50.5	1,563,113	92.7	627,047	37.2	845,108	50.4	931,905	56.8
April	1,080,667	63.2	1,485,231	91.0	550,551	33.7	771,752	47.5	907,904	57.1
May	1,087,395	63.4	1,443,477	85.5	509,811	30.2	795,689	47.4	1,084,057	66.0
June	978,030	57.1	1,405,078	85.8	524,994	32.1	607,562	49.7	1,209,684	76.1
July	1,050,085	61.3	1,315,353	77.9	484,611	28.8	745,364	44.5	1,296,887	79.2
August	1,019,882	59.6	1,225,907	72.6	615,521	36.3	885,636	52.7		
September	1,060,708	62.0	1,161,113	71.1	635,645	37.5	1,086,683	66.9		
October	1,108,973	62.6	875,972	52.0	730,312	43.1	1,345,855	79.9		
November	974,292	59.2	648,727	39.7	749,328	45.6	1,406,205	86.1		
December	1,178,598	68.8	539,553	32.1	765,868	45.2	1,443,969	85.8		
Yearly adjustment	(—)40,163	...	(—)87,106	....	(+)29,159	...	(—)44,865	...		
Total for year	11,905,002	58.2	14,097,666	70.4	7,315,506	36.7	11,707,251	59.4		

* Rolled and finished steel capacity.

Railroad Buying

. . . Rock Island 1500-car program approved, rail prices extended

Equipment buying in the past week was at a relatively slow pace, compared with the heavy purchases of the preceding week.

Rock Island has been authorized by court to purchase 800 box cars, 200 automobile cars and 100 gondolas at an approximate cost of $3,090,000, and to rebuild 300 flat cars and remodel 100 coal cars in the road's own shops. Union Pacific is inquiring for 1000 ballast cars. Akron, Canton & Youngstown has ordered two 2-8-2 locomotives from Lima Locomotive Works.

The Army is expected to shortly issue bids on 150 to 600 tank cars and is conducting experiments toward developing a box car capable of mounting anti-aircraft guns, complete with fire control apparatus.

Although not yet officially announced, current quotations on standard rails have been reaffirmed for the fourth quarter covering deliveries in the spring of 1941. A week ago some makers were disposed to name present prices up to Nov. 1, 1940 but subsequent information indicates that orders will be accepted at today's prices through the end of the year. Centrail Railroad of Brazil recently purchased approximately 20,000 tons of rails from Carnegie-Illinois Steel Corp. Wheeling & Lake Erie has awarded 500 tons to the same steel company. Placement of 5,000 tons of 112-lb. rails by Wabash, recently authorized by a U. S. District court, is expected during the next few days. The Virginian has bids out for 10,000 tons of rails and accessories.

A GALVANIZED METAL

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523 DRAWS . . . AND NOT A DUD!

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Next the bonderized surface of ARMCO PAINTGRIP came into play. This special mill finish permitted quick painting in any color! No etching, no loss of the protective zinc coating.

Time and money were saved on make-ready too. Only a soapy water solution was needed to prepare the sheets for the dies. Since oil was not used surface cleaning before painting was easier and less costly.

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ARMCO

ZINCGRIP-PAINTGRIP SHEETS

Wire Products

. . . Bale tie producers hard pressed to meet demands

Production at CLEVELAND and YOUNGSTOWN continues steady with capacity ample to meet considerably heavier demand in most items. Large backlogs are held by fine stainless wire drawers over the nation, due to the rapid development of new applications. Bale tie producers are hard pressed to meet the strong demand which has resulted from excellent crops. Total wire sales at PITTSBURGH so far this month are running slightly ahead of the corresponding period a month ago, the pick-up being noted in wire rods and manufacturers' wire.

Orders in the CHICAGO district are just about keeping pace with shipments. Customers in this area have built up their inventories to an average of 90 days' supply and the consistency of their current demand indicates that this level is being maintained.

Structural Steel

. . . Awards for week slightly higher at 22,000 tons

Fabricated structural steel awards of 22,000 tons compare with 21,400 tons last week. The largest letting is 4000 tons of Naval air bases on islands in the Pacific Ocean.

New structural steel projects jumped to 23,700 tons from 9425 tons a week ago.

Shipbuilding

. . . Navy to open bids Sept. 18 on 8 minesweepers

A $939,900 contract for construction of 15 all-steel barges has been awarded the American Bridge Co., Pittsburgh, by the Commerce Department's Inland Waterways Corp. The barges, designed for a maximum capacity of 27,000 tons, will be constructed at Ambridge, Pa. The order was placed pursuant to a program of improvement and modernization of the government-owned and operated barge lines.

The Navy Department will open bids Sept. 18 for construction of eight minesweepers of approximately 600 tons standard displacement. Bids will be received in lots of two, three or four. The eight vessels will require about 2500 net tons of plain steel.

Sheets and Strip

. . . Substantial orders reported coming from Detroit

Sheet and strip orders at PITTSBURGH in the past week reflected a pickup in automotive demand which represents the first substantial takings of steel from this source in a considerable number of weeks. Miscellaneous sheet and strip requirements show little or no change from a week ago and although the number of buyers may have contracted, total tonnage is changed but little.

Sheet releases at CLEVELAND continue to gain only slowly. New orders consist principally of fill-in lots for immediate use. Production of many household items like refrigerators is marking time until fall when inventory for the spring months will be built up. Bids were scheduled to close Aug. 21 upon 5000 grain bins for the Government, each involving around 1000 lb. of heavy coated galvanized sheets and 1000 lb. of other steel, or around 5000 net tons altogether.

Improved automotive demand for sheets during the past week, tended to sustain the order rate in the SOUTHERN OHIO District at about 75 per cent. Foreign business is very light, although mill interests indicate that substantial inquiries are now in the process of quotation. On this business, of course, delivery will also be a very important item. No defense orders have yet reached this area, although mill interests are looking forward to this source as bringing higher demand in operations during the fourth quarter. Currently, operations are about 85 per cent of capacity, with a substantial backlog for late September shipment, which in all probability will require capacity production.

Sheets for the automobile industry which have been ordered at CHICAGO, are for delivery before Sept. 30 and will, therefore, presumably receive the $4 concession. Apparently these sheets were ordered during the time the concession was in force and releases are just now coming in. So far as can be learned here, virtually no sheets for the automobile industry are on order here for delivery after Sept. 30. These orders will, of course, be seen as soon as manufacturers

Here's Great

DRILL NEWS

NEW "Buffalo"

"RPMster"

Variable Speed

DRILL

Truly, a remarkable advance in drill design! Its trim, sleek appearance bespeaks swift, efficient operation — instant change of speed with touch of a lever, and *100 different speeds* for drilling, tapping, spot facing, counter-boring, hollow-milling, etc. The "RPMster" is ruggedly built for years of severe service, with positive V-belt drive, six spline alloy steel spindle, all-geared, semi-automatic feed, steel back gears. Controls easily accessible. Motor, starter, speed change mechanism, coolant system and wiring fully enclosed.

Built in two sizes, with respective capacities of 1" and 1½" in cast iron. (Pedestal type only and in multiples of one to six spindles.) Overhang on all models, 13". Write today for Bulletin 3275 just off the press.

BUFFALO FORGE COMPANY

492 Broadway Buffalo, N. Y.

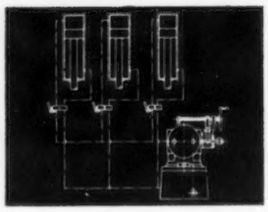
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo" RPMster DRILL

are able to judge the reception of the 1941 models. New sales of sheets are being made at a fair rate, though the tonnage is relatively light. The companies that are ordering sheets today at the full market price are for the most part manufacturers who had covered at the lower prices and either are needing more steel now or are making reservations on the order books for 30 to 60 day deliveries.

Production has been stepped up moderately in the ST. LOUIS area since Aug. 1 and shipments have also increased. Movement of galvanized roofing to the country is showing less than seasonal expansion but is expected to get into its expected stride early in September. Strip releases by automotive industry shows some improvement.

AN ADVANTAGE OF A-E-CO HELE-SHAW FLUID POWER



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Tubular Goods

• • • **Because of a fair** volume of miscellaneous line pipe orders, as well as a small pick-up in the sale of oil-country casing, total tubular sales so far this month at PITTSBURGH reflect an improvement from a month ago. Some of the recent large scale line pipe projects for the transmission of natural gas, while important from the standpoint of potential orders later on, are not expected to materialize in the near future owing to the magnitude of the undertaking. At YOUNGSTOWN and LORAIN pipe mills this week are scheduled heavily while at CLEVELAND electric weld production continues strong against large order backlogs.

Plates

. . . Deliveries continue to run from 8 to 10 weeks

Plate orders at PITTSBURGH registered as great a volume in the past week as in the week before and deliveries on wide plates continue to run from eight to 10 weeks. Some steel makers who had utilized their high speed mills for rolling plates are now faced with increased production difficulties following an influx of automotive sheet orders. Approximately 9600 tons of plates and shapes will be required for 15 barges recently ordered by Inland Waterways Corp.

While new inquiry in the NEW YORK area is not quite as heavy as two weeks ago, shipments to consumers are running at a pace slightly above that of two weeks ago. Railroad equipment makers, plate fabricators, shipyards and, to a lesser degree, warehouses, are chief contributers to the maintenance of present flow of shipments. Wide plate deliveries are becoming more and more protracted, with some sellers quoting mid-October on new orders. Narrow plate deliveries, however, are being made in from two to four weeks. Outside of the British, export demand is limited to sporadic lots from Dutch East Indies and South Africa. South American demand continues very erratic.

The British are acting to clarify the situation surrounding material originally ordered by the French, but taken over by the British after

the capitulation of France. One mill has been requested to ship ingots against the French tonnage, while another mill has been asked to ship sheared plate against an original order of universal material.

CHICAGO plate mills are being rushed to supply the needs of structural fabricators, tank builders, railroad car builders and railroad repair shops. At some plants the plate mills, especially in the wider sizes, are the most congested of all, deliveries in some cases ranging up to eight weeks. Each week brings out further inquiries and orders for railroad equipment and the end is not yet in sight.

Merchant Bars

. . . Heavier buying expected in early September

Orders up to Aug. 19 at CLEVELAND were behind the volume received in the comparable part of July. Domestic consumers appear well protected for their present needs in view of seasonally light activity. A number of promising inquiries are outstanding, however, and early September is counted upon to produce better buying activity.

Bar demand in CHICAGO is somewhat spotty. The large manufacturers of tractors and farm implements are still operating at a high rate, but they are well represented on the order books and are placing little new business at the moment. Forgers, warehouses and cold drawers continue active consumers. Deliveries on hot rolled carbon bars range from virtually prompt to five to six weeks.

Hot rolled bar sales at PITTSBURGH have been more numerous in the past week, miscellaneous demand having held at recent levels, but a step up in requirements has materialized as the result of an increased volume of automotive specifications. As yet bar requirements for the U. S. Government preparedness program are only a minor portion of total sales but orders of this nature are steadily increasing in number. Cold finished bar demand continues at recent levels with significant support emanating from automobile centers. Demand for alloy bars from both domestic and export sources continues unabated with deliveries still quite extended.

Tin Plate

. . . Operations decline sharply but shipments hold

Tin plate specifications in the past week continued to decline sharply and for the first time in several months a marked drop has also occurred in production. Shipments, however, are not off much from a week ago. The drying up of the export market is mainly responsible for the leveling off in tin plate activity although in recent weeks fresh domestic orders leave much to be desired. It is pointed out, however, that the tin plate operating rate is misleading to the extent that substantial capacity has been added within the past few years, thus indicating that from a tonnage standpoint the drop in tin plate production and consumption is not as great as appears from the comparison of per cent of capacity figures.

IRON and STEEL PRODUCTS

ANDREWS STEEL

THE Andrews Steel trade-mark is indisputable proof of high quality and ability to deliver extra performance under all conditions. But, more than that . . . this famous trade-mark safeguards your good name because Andrews quality is transmitted to every product of which iron and steel become a part. Your inquiries will be welcomed.

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THE NEWPORT ROLLING MILL COMPANY
THE GLOBE IRON ROOFING & CORRUGATING CO.

Machine Tools

. . . SALES, INQUIRIES AND MARKET NEWS

August Buying at High Rate

Chicago

• • • **Orders received the** first half of August appear to be as numerous as in July which, for some sellers, was the best month in many years. The long delayed program of Goss Printing Press Co. covering the manufacture of gun mounts, has finally been released and the major portion of the program was placed last week. Buda Co., Harvey, Ill., also ordered a number of tools last week for production of diesel tank engines. Another group of production machinery was ordered last week by Continental Motors, Muskegon, Mich. Aside from these outstanding purchases, all of which are directly related to the rearmament program, business has been running along normal channels. Used and remanufactured machine tools are at a premium. The supply of old equipment that is worthy of rebuilding is negligible, and prices for what is available are much higher than a few months ago.

The Rock Island Arsenal has been in the market consistently for the past several months and recently ordered a number of large horizontal boring mills. The Hannifin Mfg. Co., of Chicago, was awarded an order by the War Department for artillery material amounting to $244,061.

No Let-Up Seen in Buying

New York

• • • **Brisk buying** of all classes of machine tools continues in this district. Almost all of current business is confined to concerns engaged in the greatly expanded national defense program, with the exception of some of the secondary lines of cheaper machine tools, which are going to light industry and schools. Some dealers are confining their entire efforts to servicing only those engaged in Government work. As more ordnance and navy work is placed in this area, this present high demand will be increased, dealers expect. Some very large machinery buying programs are pending in the aircraft industry. After weeks of study of engineering proposals and quotations, both Pratt & Whitney and Wright Aeronautical Corp. will soon be ready to release orders for large quantities of machines.

Deliveries are becoming more extended. Backlogs are still on the increase and dealers who have made recent visits to the principals they represent indicate that incoming orders are double current shipments in many cases. Release of some foreign orders will help the situation. Machines held at the docks for delivery to France are being sold locally through a used machinery dealer, and a bill is being introduced in Congress to authorize the President to requisition and take over machine tools, the exportation of which has been denied by the State Department. This bill is aimed principally at machinery held by the Russians at the dock.

Production the Problem

Cincinnati

• • • **Production problems are** the most pressing in the district machinery market. With orders for all types of tools continuing to flow in steady stream, the problem of making delivery becomes increasingly more important. Plant executives are making some shifts in departmental locations and seeking to utilize the present floor space to greater advantage, to the end that more production may be obtained. Very little new building has been indulged, since the managements general feeling is one of conservatism to insulate against "boom hysteria". While no definite figures, of course, would be available, the output in machinery is probably a trifle better than some months ago. Labor supply of skilled men, of course, continues to be somewhat disturbing and all skilled men are being used as rapidly as they appear.

Output Being Stepped Up

Cleveland

• • • **Production appears to** be increasing again here. With extra shifts and liberal overtime, rearrangement of equipment and additional inspection facilities, output of several plants is at a new peak. The amount of work let out to jobbing shops is surprisingly large and this is another important factor in the production gains. Engineering departments working on tooling are hard pressed to meet all the demands upon them.

Orders are greatly diversified with the aircraft and electrical equipment industries probably most prominent. Canada is more active in buying and Australia has been in the market for heavy purchases of dies and taps. Surprisingly good delivery promises have been made on some automatic machines recently ordered.

Big Programs Ready

Detroit

• • • **Release of specifications** and orders for vast quantities of machine tools and plant equipment for recently announced national defense projects in the Detroit area should be underway by Sept. 1.

It has been indicated that formal signing of the Packard-Rolls orders will be accomplished some time early next month, and the Packard management is known to have carried the tooling plans to such an advanced stage that a majority of important machine tools can be ordered immediately. The Ford manufacturing contract for more than 4000 Pratt & Whitney radial engines is still only verbal, but an official "go ahead" has been given and orders are expected to be sent out any day for most of the machines.

The Chrysler tank order, and a similar one pending with General Motors, have already been in the tool study stage for about six weeks, and placing of orders should commence in the next month.

Non-Ferrous Metals

. . . MARKET ACTIVITIES AND PRICE TRENDS

New York, Aug. 20—Despite the seeming lack of activity on the surface, a fair amount of business was done in the non-ferrous markets in the past week, and prices in most markets were much firmer than has been the case in recent weeks. The heavier demand for spelter resulted in an increase of ¼c. on Wednesday, but otherwise prices were little changed from a week ago. The price situation, however, is still delicately poised and any new trend in the situation abroad could easily upset the present setup.

Domestic copper sales, while on the light side judged by recent buying movements, have been sufficient to support the producers' present price of 11c. per lb., delivered Connecticut Valley. Toward the end of the past week, custom smelters' prices, which had been running ⅛c. to ¼c. below the producers' price, showed a firmer tendency and today custom smelters were generally asking 11c. The tightness of nearby supplies and the slow but steady expansion in consumption are undoubtedly factors in this strengthening. Sales of the red metal for the month through Saturday total about 30,400 tons. Export demand is sporadic, with the Japanese still indicating interest in lots for immediate shipment. Export prices remain in the neighborhood of 9.90c. per lb., c.i.f.

Lead

The price reductions instituted 10 days ago have been followed by fairly active demands. The past week's sales volume showed a decided improvement over the previous period, with most sellers consistently exceeding daily quotas. New demand centers on September material, but new bookings for August are surprisingly large in view of the large tonnages already bought for this month. Estimates place September needs at around 40 per cent bought. Prices were unchanged in the past week at 4.75c. per lb., New York.

Zinc

Heavier demand for spelter, reflected in a rise in Prime Western sales to 6694 tons for the week, from 3647 in the previous week, was accompanied by ¼c. increase in prices to a basis of 6.89c. per lb., New York. Factors in this increase were the shrinking of nearby spelter and the growing activity in export demand. The higher price level had little noticeable influence on buying and a strong demand has been in evidence since the increase. More interest is indicated in forward material buying. Shipments in the past week were 5458 tons compared with 6236 in the previous week. Backlogs now stand at 58,456 tons.

Tin

Consumer demand was light and the prices in the past week were unchanged at 50.75c per lb., New York, for prompt Straits. In view of the spread still existing between present market price and the government buying price, apparently no sales were made to that agency in the past week. Domestic consumers, on the other hand, appear to be holding off, expecting prices to at least decline to 50c. While domestic users at the moment are well supplied, with substantial tonnages afloat, any new development in the Far East, which last week was comparatively quiet, might result in efforts to still further enlarge plant stocks.

(Non-ferrous prices on page 105)

RODINE

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DEPT. 309, AMBLER, PENNA.
Detroit, Mich., 6339 Palmer Ave., E. Canadian Branch, Walkerville, Ont.

Scrap . . . MARKET ACTIVITIES AND QUOTATION TRENDS

• • • **Quiet resumption of** mill buying on a larger scale, particularly in the East, in the past week was accompanied by a general rise in quotations on steel making items. This buying has acted to clarify somewhat the price situation and current prices are based largely on mill sales, rather than broker-deal transactions, as has been the case over the past month or so. Increases in Chicago, Pittsburgh and Philadelphia boosted THE IRON AGE scrap composite 37c. this week to $19.00, highest since the week of June 25, and 92c. below the year's high recorded in the week of June 18. The composite is now 83c. above the low point of recent weakness. Export demand from Canada continues to bolster prices in the Central districts. Low phosphor demand from electric furnace operators is especially active. Aggregate export loadings have not showed much change in volume recently and no difficulty has been encountered yet in obtaining export licenses.

Pittsburgh

On the basis of consumer and broker sales, No. 1 heavy melting is quotable this week at $18.50 to $19, up 25c. from last week's average. Having no bearing on the actual quoting of open market scrap prices, but nonetheless interesting from a market factor standpoint, has been the exchange, within the past week, between two steel companies of a moderate sized amount of pig iron for No. 1 heavy melting scrap. It is understood that another steel company also made an exchange of pig iron for scrap with the same company which furnished the scrap in the former transaction. The quality of the No. 1 heavy melting involved was a better grade than ordinary dealers' No. 1 steel and is said to be equal to or better than railroad heavy melting quality.

Chicago

On the basis of a mill purchase, heavy melting steel is quoted at a flat $18.50 this week. Brokers are finding it necessary to pay the same figure for old material and some are said to be offering even more. A railroad is understood to have received around $19.60 gross, delivered Chicago for its heavy melting steel a few days ago. Shipments from this district to Hamilton, Ont., are in undiminished volume, encouragement being given this movement by low summer rail rates on scrap from here and Milwaukee to points across the border.

Philadelphia

The market here advanced another 50c. this week on the basis of sales into consumption. Scrap persists in its refusal to move in freely and it is felt that still higher prices will be required to bring out supplies adequate to meet fall mill schedules. Export buying is very slow.

Youngstown

Awaiting a sale into consumption, the market here remains unchanged at the start of this week, with No. 1 heavy melting still quoted at $18.50 to $19 per ton. Restrictions are in effect at Warren, where furnace relining is being done.

Cleveland

Evidences of underlying strength continue to crop up here, but at the start of this week there had been no fresh mill buying to justify any changa in published quotations. No. 1 heavy melting remains at $18 to $18.50 per ton. Shipments are going forward unhampered by restrictions.

Buffalo

The market here maintains a strong undertone and price quotations remain unchanged for the third consecutive week. No sales of heavy melting were reported within the past week. Brokers express confidence that all grades of scrap soon will command higher prices and are reluctant to sell any large tonnages at present quotations. Increased demand for low phos. specialties has been noted.

St. Louis

The market here continues very strong, with upward revisions in dealers' lists ranging from 25c. to $1. Strength is due principally to scant offerings and better inquiries from outside consuming points. Shipments from the country have decreased and the industries are originating little material. No sales of size were reported, but inquiries are out from several mills which are likely to result in orders during the next two or three weeks.

Birmingham

While prices as of Aug. 1 remain unchanged, the market is definitely firmer, due to increased export activity. Four boats have been loaded at Mobile and one at Pensacola this month, with the cargoes reportedly bound for England. Supplies in this district appear ample for consumer demand.

Cincinnati

Better prices on foundry and specialty items on recent railroad lists have strengthened market undertone here. Dealers generally are bidding from 50c. to $1 higher on all items with sentiment continually bullish. Sales to mill interests, however, are negligible. Lack of mill interest has resulted in some items, such as borings and turnings, finding their way into Valley markets.

Detroit

Mill resistance to higher prices of scrap, encountered in the past week, has resulted in a leveling out of prices, although market sentiment can be said to be stronger. Other influences in the local market are mixed in nature including such factors as continued high steel production, lack of mill-buying locally, buying from outside Detroit, and increased scrap production by automotive plants.

New York

Reflecting the higher market in eastern Pennsylvania, prices here on heavy melting steel and several cast items are quotable 50c. higher this week. Movement of scrap to local foundries is at a moderate pace, but shipments to consumers in eastern Pennsylvania are expanding. Loading for export continues, with several new boats taking cargoes. No difficulty has been experienced in obtaining export licenses.

Boston

Buying for domestic consumption is more active, with Eastern Pennsylvania consumers buying steel turnings, bundled skeleton and blast furnace material. Brokers are paying $8.50 on cars for the turnings, $11.50 to $12 for the bundled skeleton, and $6.50 and $6.75 for blast furnace material. For a Weirton mill, brokers offer $7.88 on cars for turnings, but are obtaining little. Washburn Wire Co. has reentered the market, offering $16 delivered for No. 1 steel and $14.50 for No. 2. American Steel & Wire Co. has bought a little No. 1 locally, paying $15.50 delivered. Eastern Massachusetts consumers have bought a sizable tonnage of cleaned engine blocks at $15.50 delivered.

Toronto

While prices remain unchanged here there is a firmer undertone in Toronto and Montreal areas. Melters continue to take all offerings and are making more persistent demands on dealers for larger tonnages both for spot and future delivery. Anticipating higher prices, most dealers are working only on short term contracts and are declining big tonnage offerings. Some mills are importing heavily from United States and big deliveries are being made over water routes. More turnings and borings are now appearing on the market from munitions plants. Cast and stove plate are in brisk demand, with supplies somewhat limited. Dealers report good offerings from rural districts as well as from automobile wreckers.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$18.50 to $19.00
Railroad heavy mltng.	20.50 to 21.00
No. 2 heavy melting	17.00 to 17.50
Railroad scrap rails	21.50 to 22.00
Rails 3 ft. and under	23.50 to 24.00
Comp. sheet steel	18.50 to 19.00
Hand bundled sheets	17.50 to 18.00
Heavy steel axle turn.	17.50 to 18.00
Machine shop turnings	14.00 to 14.50
Short shov. turnings	16.00 to 16.50
Mixed bor. & turn.	12.50 to 13.50
Cast iron borings	12.50 to 13.50
Cast iron carwheels	**20.00 to 20.50**
Heavy breakable cast.	17.00 to 17.50
No. 1 cupola cast	**19.50 to 20.00**
RR. knuckles & coup.	25.00 to 25.50
Rail coil springs	25.00 to 25.50
Rail leaf springs	25.00 to 25.50
Rolled steel wheels	25.00 to 25.50
Low phos. billet crops	23.50 to 24.00
Low phos. punchings	**25.00 to 26.00**
Low phos. heavy plate	23.50 to 24.00
Railroad malleable	**23.50 to 24.00**

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$19.50 to $20.00
No. 2 hvy. mltng. steel	18.00 to 18.50
Hydraulic bund., new	19.50 to 20.00
Hydraulic bund., old	16.50 to 17.00
Steel rails for rolling	**22.00 to 22.50**
Cast iron carwheels	21.00 to 21.50
Hvy. breakable cast	20.00 to 20.50
No. 1 cupola cast	21.50 to 22.00
Mixed yard (f'd'y) cast	18.50 to 19.00
Stove plate (steel wks.)	16.50 to 17.00
Railroad malleable	**22.50 to 23.00**
Machine shop turn.	14.00
No. 1 blast furnace	12.50 to 13.00
Cast borings	12.50 to 13.00
Heavy axle turnings	17.00 to 17.50
No. 1 low phos. hvy	**24.00 to 24.50**
Couplers & knuckles	**24.00 to 24.50**
Rolled steel wheels	**24.00 to 24.50**
Steel axles	23.50 to 24.00
Shafting	**24.50 to 25.00**
Spec. iron & steel pipe	**17.00 to 17.50**
Cast borings (chem.)	**14.00 to 14.50**

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel	$18.50
Auto. hvy. mltng. steel alloy free	**$17.25 to 17.50**
No. 2 auto steel	14.75 to 15.25
Shoveling steel	18.50
Factory bundles	17.75 to 18.00
Dealers' bundles	16.25 to 16.50
No. 1 busheling	17.25 to 17.50
No. 2 busheling, old	10.00 to 10.50
Rolled carwheels	**20.50 to 21.00**
Railroad tires, cut	**21.00 to 21.50**
Railroad leaf springs	19.50 to 20.00
Steel coup. & knuckles	**20.50 to 21.00**
Axle turnings	16.75 to 17.25
Coil springs	**22.00 to 22.50**
Axle turn. (elec.)	17.50 to 17.75
Low phos. punchings	**20.50 to 21.00**
Low phos. plates 12 in. and under	**20.50 to 21.00**
Cast iron borings	11.50 to 12.00
Short shov. turn.	12.00 to 12.50
Machine shop turn.	12.00 to 12.50
Rerolling rails	21.50 to 22.00
Steel rails under 3 ft.	**19.75 to 20.25**
Steel rails under 2 ft.	**21.00 to 21.50**
Angle bars steel	**20.00 to 20.50**
Cast iron carwheels	18.50 to 19.00
Railroad malleable	**22.00 to 22.50**
Agric. malleable	**14.75 to 15.25**

	Per Net Ton
Iron car axles	23.50 to 24.00
Steel car axles	**22.00 to 22.50**
Locomotive tires	**15.00 to 15.50**
Pipes and flues	**11.50 to 12.00**
No. 1 machinery cast	16.50 to 17.00
Clean auto. blocks	17.25 to 17.75
No. 1 railroad cast	**15.00 to 15.50**
No. 1 agric. cast	**13.50 to 14.00**
Stove plate	10.75 to 11.25
Grate bars	12.50 to 13.00
Brake shoes	12.50 to 13.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$18.50 to $19.00
No. 2 hvy. mltng. steel	17.50 to 18.00
Low phos. plate	21.50 to 22.00
No. 1 busheling	**17.75 to 18.25**
Hydraulic bundles	**18.00 to 18.50**
Machine shop turn.	13.00 to 13.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$18.00 to $18.50
No. 2 hvy mtng. steel	17.00 to 17.50
Comb. sheet steel	$17.50 to $18.00
Light bund. stampings	**14.50 to 15.00**
Drop forge flashings	17.00 to 17.50
Machine shop turn.	11.50 to 12.00
Short shov. turn.	12.00 to 12.50
No. 1 busheling	17.25 to 17.75
Steel axle turnings	17.00 to 17.50
Low phos. billet and bloom crops	23.00 to 23.50
Cast iron borings	12.00 to 12.50
Mixed bor. & turn.	12.00 to 12.50
No. 2 busheling	12.00 to 12.50
No. 1 cupola cast	20.50 to 21.00
Railroad grate bars	14.00 to 14.50
Stove plate	14.00 to 14.50
Rails under 3 ft.	23.00 to 23.50
Rails for rolling	23.00 to 23.50
Railroad malleable	21.50 to 22.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$18.00 to $18.50
No. 2 hvy. mltng steel	16.00 to 16.50
Scrap rails	20.00 to 21.00
New hvy. b'ndled sheets	16.00 to 16.50
Old hydraul. bundles	14.50 to 15.00
Drop forge flashings	16.00 to 16.50
No. 1 busheling	16.00 to 16.50
Machine shop turn.	11.00 to 11.50
Shov. turnings	13.00 to 13.50
Mixed bor. & turn.	11.50 to 12.00
Cast iron borings	11.50 to 12.00
Knuckles & couplers	22.00 to 22.50
Coil & leaf springs	22.00 to 22.50
Rolled steel wheels	22.00 to 22.50
No. 1 machinery cast	**19.50 to 20.00**
No. 1 cupola cast	**18.00 to 18.50**
Stove plate	15.50 to 16.00
Steel rails under 3 ft.	23.50 to 24.00
Cast iron carwheels	18.00 to 19.00
Railroad malleable	22.00 to 23.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	$16.00 to $16.50
No. 1 hvy. melting	15.75 to 16.25
No. 2 hvy. melting	14.50 to 15.00
No. 1 locomotive tires	**17.50 to 18.00**
Misc. stand. sec. rails	18.50 to 19.00
Railroad springs	20.00 to 20.50
Bundled sheets	11.50 to 12.00
Cast bor. & turn.	9.00 to 9.50
Machine shop turn.	8.50 to 9.00
Heavy turnings	**11.25 to 11.75**
Rails for rolling	20.00 to 20.50
Steel car axles	**21.00 to 21.50**
No. 1 RR. wrought	12.50 to 13.00
No. 2 RR wrought	15.00 to 15.50
Steel rails under 3 ft.	**20.75 to 21.25**
Steel angle bars	18.00 to 18.50
Cast iron carwheels	18.00 to 18.50
No. 1 machinery cast	19.00 to 19.50
Railroad malleable	19.00 to 19.50
Breakable cast	16.00 to 16.50
Stove plate	11.50 to 12.00
Grate bars	12.00 to 12.50
Brake shoes	13.50 to 14.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel	$14.75 to $15.25
No. 2 hvy. mltng. steel	13.25 to 13.75
Scrap rails for mltng.	20.25 to 20.75
Loose sheet clippings	10.25 to 10.75
Hydrau. b'ndled sheets	14.00 to 14.50
Cast iron borings	6.25 to 6.75
Machine shop turn.	7.25 to 7.75
No. 1 busheling	10.75 to 11.25
No. 2 busheling	5.00 to 5.50
Rails for rolling	21.75 to 22.25
No. 1 locomotive tires	17.00 to 17.50
Short rails	22.25 to 22.75
Cast iron carwheels	16.25 to 16.75
No. 1 machinery cast	18.75 to 19.25
No. 1 railroad cast	17.25 to 17.75
Burnt cast	10.75 to 11.25
Stove plate	10.75 to 11.25
Agricul. malleable	15.25 to 15.75
Railroad malleable	18.25 to 18.75
Mixed hvy. cast	16.00 to 16.50

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	$15.00
No. 2 hvy. melting steel	14.00
No. 1 busheling	13.00
Scrap steel rails	**15.00**
Steel rails under 3 ft.	17.50
Rails for rolling	17.50
Long turnings	**5.00**
Cast iron borings	8.50
Stove plate	11.00
Steel axles	**18.00**
No. 1 RR wrought	12.00
No. 1 cast	16.00
No. 2 cast	12.50
Cast iron carwheels	**13.00**
Steel carwheels	15.00

DETROIT

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 heavy melting	$15.00 to $15.50
No. 2 heavy melting	14.00 to 14.50
Borings and turnings	10.75 to 11.25
Long turnings	9.75 to 10.25
Short shov. turnings	10.75 to 11.25
No. 1 cast	18.50 to 19.00
Automotive cast	18.50 to 19.00
Hvy. breakable cast	15.00 to 15.50
Stove plate	11.75 to 12.25
Hydraul. Comp. sheets	17.00 to 17.50
New busheling	16.00 to 16.50
Sheet clips	14.00 to 14.50
Flashings	15.00 to 15.50
Low phos. plate	18.50 to 19.00

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	$15.50 to $16.00
No. 2 hvy. mltng. steel	14.00 to 14.50
Hvy. breakable cast	16.00 to 16.50
No. 1 machinery cast	17.50 to 18.00
No. 2 cast	**15.00 to 15.50**
Stove plate	11.50 to 12.00
Steel car axles	**20.00 to 20.50**
Shafting	**20.00 to 20.50**
No. 1 RR. wrought	**14.50 to 15.50**
No. 1 wrought long	**13.00 to 13.50**
Spec. iron & steel pipe	**12.00 to 12.50**
Rails for rolling	**16.50 to 17.50**
Clean steel turnings*	9.00 to 9.50
Cast borings*	**8.50 to 9.00**
No. 1 blast furnace	**8.50 to 9.00**
Cast borings (chem.)	10.00 to 11.00
Unprepared yard scrap	8.00 to 8.50
Light iron	6.00 to 6.50

Per gross ton delivered local foundries:

No. 1 machin. cast	$18.00 to $19.00
No. 2 cast	16.00 to 16.50

* $1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	$14.00 to $14.25
Machine shop turn.	8.00 to 8.50
Mixed bor. & turn.	6.50 to 6.75
Bun. skeleton long	11.50 to 12.00
Shafting	18.75 to 19.00
Stove plate	11.25 to 11.50
Cast bor. chemical	8.00 to 8.50

Per gross ton delivered consumers' yards:

Textile cast	$17.00 to $20.00
No. 1 machine cast	**17.00 to 19.00**

Per gross ton delivered dealers' yards:

No. 1 hvy. mltng. steel	$13.75 to $14.00
No. 2 steel	12.75 to 13.00

PACIFIC COAST

Per net ton delivered to consumer:

	San Fran.	Los Ang.	Seattle
No. 1 hvy. mltng. steel	$13.00	$13.00	$13.00
No. 2 hvy. mltng. steel	12.00	12.00	12.00
Bundles	11.00	11.00	11.00

CANADA

Dealers' buying prices at these yards, per gross ton:

	Toronto	Montreal
Low phos. steel	$11.50	$11.00
No. 1 hvy. mltng. steel	**11.25**	**10.75**
No. 2 hvy. mltng. steel	**10.00**	**9.50**
Mixed dealers steel	**8.75**	**8.25**
Drop forge flashings	9.75	9.25
New loose clippings	8.75	8.25
Busheling	**6.00**	**5.50**
Scrap pipe	7.75	7.25
Steel turnings	7.25	6.75
Cast borings	6.75	6.25
Machinery cast	**20.00**	**19.00**
Dealers' cast	**19.00**	**18.00**
Stove plate	14.50	13.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges

No. 1 hvy. mltng. steel	$15.50 to $16.00
No. 2 hvy. mltng. steel	14.00 to 14.50
No. 2 cast	15.00 to 15.50
Stove plate	12.50 to 13.00

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel	$16.00 to $16.25
No. 2 hvy. mltng. steel	14.50 to 14.75
Rail (scrap)	16.00 to 16.50

Philadelphia, delivered alongside boats, Port Richmond

No. 1 hvy. mltng. steel	$17.75 to $18.00
No. 2 hvy. mltng. steel	16.50 to 17.00

Construction Steel

. . . STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Lettings in fair volume at 22,000 tons; new projects advance to 23,700 tons from 9425 tons last week; plate awards call for 10,250 tons.

AWARDS

NORTH ATLANTIC STATES

1424 Tons, Bradford County, Pa., project on route 14, to Bethlehem Steel Co., Bethlehem, Pa., through H. R. Dickens, Philadelphia.

650 Tons, New Brunswick, N. J., manufacturing building for Triangle Conduit & Cable Co., to Ingalls Iron Works Co., Birmingham.

475 Tons, Washington, buffing shop for Navy, to Barber & Ross, Washington.

335 Tons, Hartford, Conn., Hamilton Standard Propeller Division, United Aircraft Corp., alterations and extensions, to R. C. Mahon Co., Detroit.

250 Tons, Rochester, N. Y., plant addition for Consolidated Machine Tool Co., to Leach Steel Corp., Rochester.

280 Tons, Green Haven, N. Y., buildings Nos. 11 and 12, to Belmont Iron Works, Philadelphia.

240 Tons, Ulster County, N. Y., highway bridge, to American Bridge Co., Pittsburgh.

230 Tons, Manchester, Conn., Orford Soap Co., buildings, to Standard Structural Steel Co., Hartford, Conn.

230 Tons, Bainbridge, N. Y., building for Borden Milk Co., to American Bridge Co., Pittsburgh.

170 Tons, Newark, N. J., warehouse for Jackson & Perkins, to Bethlehem Steel Co., Bethlehem, Pa.

140 Tons, Brattleboro, Vt., State bridges, to Bethlehem Steel Co., Bethlehem, Pa.

115 Tons, Clearfield County, Pa., bridge, route 17058, to American Bridge Co., Pittsburgh.

115 Tons, Seward, Pa., turbo generator supports for Utility Management Co., to Lehigh Structural Steel Co., Allentown, Pa.

100 Tons, Pittsburgh, extension to crane runway for Pittsburgh & Lake Erie Railroad, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

100 Tons, Newstead Township, N. Y., Cedar Street bridge, to Lackawanna Steel Construction Co., Buffalo, William J. Gallagher, Medina, general contractor.

THE SOUTH

750 Tons, Power, W. Va., power house addition for West Penn Power Co., to Fort Pitt Bridge Works Co., Pittsburgh.

228 Tons, Wichita Falls, Tex., State highway bridge, to Panhandle Steel Co., Wichita Falls, and Austin Brothers, Dallas.

206 Tons, Laredo, Tex., State highway bridge, to Bethlehem Steel Co., Bethlehem, Pa.

205 Tons, Wheeling, W. Va., Sears-Roebuck store building for Hazlett Estate, to Riverside Steel Co., Wheeling.

100 Tons, Napoleonville, La., mill building for Glenwood Cooperative, Inc., to Ingalls Iron Works Co., Birmingham.

CENTRAL STATES

795 Tons, Saginaw, Mich., addition, service parts building, Chevrolet Motor Co., to Fort Pitt Bridge Works Co., Pittsburgh.

700 Tons, Chillicothe, Ohio, mill buildings for Meade Corp., to Bethlehem Steel Co., Bethlehem, Pa.

600 Tons, Alton, Ill., warehouse No. 7, plant No. 7, to Mississippi Valley Structural Steel Co., St. Louis.

385 Tons, Jackson County, Ind., highway bridge, to Vincennes Steel Co., Vincennes, Ind.

350 Tons, Pontiac, Mich., building addition for Yellow Truck & Coach Mfg. Co., to Whitehead & Kales Co., Detroit.

330 Tons, Frankfort, Ill., plant for Chicago, Wilminton & Franklin Coal Co., to Vincennes, Steel Corp., Vincennes, Ind.

310 Tons, Centerville, Ill., bridge, section 28-IVF, to Missouri Bridge & Iron Co., St. Louis.

290 Tons, Ladysmith, Wis., State bridge No. 415, to American Bridge Co., Pittsburgh.

222 Tons, Racine, Wis., Modine Mfg. Co., factory building, to Wisconsin Bridge & Iron Co., Milwaukee.

210 Tons, Milwaukee, Globe Steel Tubes Co. mill buildings, to Milwaukee Bridge Co., Milwaukee.

160 Tons, Covington, Ohio, Stillwater River State bridge, to Burger Iron Co., Akron, Ohio.

120 Tons, Avilla, Ind., State bridge, to Elkhart Bridge & Iron Co., Elkhart, Ind.

115 Tons, Caledonia, Wis., State bridge No. 259, to Wisconsin Bridge & Iron Co., Milwaukee.

100 Tons, Omaha, Neb., repairs to Union Pacific 16th Street bridge, to Paxton & Vierling Iron Co., Omaha.

WESTERN STATES

4000 Tons, Pacific Ocean Islands, Naval Air bases at Pearl Harbor and Midway Islands, to Columbia Steel Co., San Francisco.

1500 Tons, San Francisco, building for Bank of America, to Columbia Steel Co.

800 Tons, Burbank, Cal., addition to buildings Nos. 114-A, 114-C and 125-A, for Lockheed Air Corp., to Consolidated Steel Corp., Los Angeles.

335 Tons, Fairbanks, Alaska, barracks, hospital and post exchange for Army cold weather stations, to Milwaukee Bridge Co., Milwaukee.

320 Tons, Havre, Mont., Great Northern Railway span, to American Bridge Co., Pittsburgh.

160 Tons, Bonneville, Ore., 125-ton traveling crane, to Judson-Pacific Co.

125 Tons, Cheyenne, Wyo., Union Pacific Railroad turntable, to R. W. Young Mfg. Co., Chicago.

CANAL ZONE

3700 Tons, Albrook Field, Panama Canal, airplane buildings, to U. S. Steel Export Corp., through Robert E. McKee, El Paso.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

8400 Tons, St. Georges, Del., superstructure, St. Georges highway bridge, contract No. 2, for War Department; bids Sept. 9.

3000 Tons, Brooklyn, Navy Yard structures.

1000 Tons, Huntingdon County, Pa., highway viaduct; L. M. Hutchinson, Mount Union, Pa., low bidder on general contract.

700 Tons, Springfield, Mass., armory factory and laboratory; Ley Construction Co., contractor.

410 Tons, North East, Pa. State highway bridge; to readvertise for bids.

400 Tons, Geneva, N. Y., factory building for Geneva Forge Co.; bids Sept. 3.

400 Tons, Pittsburgh, General Electric Co. service shop and warehouse.

220 Tons, Victor, N. Y., school building.

200 Tons, Ashland, Mass., manufacturing plant.

195 Tons, Great Works, Me., alterations to bleach room, for Penobscot Chemical Fibre Co.

165 Tons, Concord, N. H., medical surgical building for State Hospital.

150 Tons, Buffalo, Greyhound bus terminal.

140 Tons, Green Farms, Conn., bridge No. 35.50, for New York, New Haven & Hartford Railroad.

140 Tons, New York, sewage treatment work.

115 Tons, East Norwalk, Conn., bridge for N.Y.N.H.&H. Railroad Co.

110 Tons, Amherst, Mass., Amherst College Valentine Hall.

110 Tons, New York, branch bank building, for Chemical Bank & Trust Co.

110 Tons, Parlin, N. J., nitrating house for Hercules Powder Co.

110 Tons, Jersey City, garage for Public Service Electric & Gas Co.

100 Tons, Buffalo, factory addition for Sterling Engine Co., Inc.

Unstated Tonnage, Buffalo, addition to Children's Hospital.

THE SOUTH

3000 Tons, Jefferson City, Tenn., trestle for crane, Cherokee Dam, for TVA.

125 Tons, Newport News, Va., crane beams.

CENTRAL STATES

1650 Tons, Jeffersonville, Ind., 10 storage warehouses for Government.

600 Tons, Proving Grounds, Ill., 19 buildings; bids Aug. 22.

Weekly Bookings of Construction Steel

Week Ended ——→	Aug. 20, 1940	Aug. 13, 1940	July 23, 1940	Aug. 22, 1939	Year to Date 1940	Year to Date 1939
Fabricated structural steel awards	22,000	21,400	29,925	16,450	596,425	629,025
Fabricated plate awards	10,250	4,600	3,450	1,390	108,555	109,685
Steel sheet piling awards	280	390	0	1,065	30,940	44,505
Reinforcing bar awards	10,440	11,750	12,225	6,610	297,650	304,110
Total Letting of Construction Steel	42,970	38,140	45,600	25,515	1,033,570	1,087,325

600 Tons, LaGrange, Ill., factory building, Electro-Motive Corp.
330 Tons, Manitowoc, Wis., Manitowoc Shipbuilding Co., welding shop.
255 Tons, Detroit, storage building office and boiler room for Steel Sales Corp.
250 Tons, Chicago, factory building, Goodman Mfg. Co., bids Aug. 21.
235 Tons, Hastings, Neb., Elm Street State viaduct.
225 Tons, Riverside, Ill., Brookfield High School stadium.
220 Tons, Lafayette, Ind., electrical engineering building addition for Purdue University.
190 Tons, Omaha, Ak-Sar-Ben viaduct for State.
150 Tons, Chicago, warehouse and office building for Sprague-Warner Co.; bids taken Aug. 21.
135 Tons, Greene County, Ohio, Little Miami River bridge for State.
115 Tons, Stager, Mich., State bridge over Brule River.

WESTERN STATES

250 Tons, Odair, Wash., 150-ton crane for Grand Coulee Dam; Star Iron & Steel Co., Tacoma, low bidder.
142 Tons, Manhattan, Mont., highway overpass, bids Aug. 23.
220 Tons, Salt Lake City, hangar; bids Aug. 23.
135 Tons, Nyssa, Ore., warehouse for Amalgamated Sugar Co.
105 Tons, Kemmerer, Wyo., beam spans; bids Aug. 26.

FABRICATED PLATES

AWARDS

9600 Tons, Cairo, Ill., 15 steel barges for Inland Waterways Corp., to American Bridge Co., Pittsburgh.
650 Tons, Moffett Field, Sunnyvale, Cal., wind tunnel, to Moore Dry Dock Co., Oakland, Cal.

PENDING PROJECTS

500 Tons, Long Beach, Cal., municipal gas air mix plant, Oilfields Construction Co., low bidder on general contract.
250 Tons, Ogden, Utah, fabricated pipe for Bureau of Reclamation (Specification 1409-D); bids Aug. 27.

SHEET PILING

AWARDS

280 Tons, New York, bulkhead wall, contract 32, East 30th-36th Streets, to American Bridge Co., Pittsburgh.

PENDING PROJECTS

120 Tons, Cleveland, river dock for Standard Oil Co. of Ohio.

Pipe Lines

Lone Star Gas Co., 1915 Wood Street, Dallas, Tex., has authorized new 12-in. welded steel pipe lines from Opelika gas field near Murchison (Henderson County), Tex., to Trinidad, Tex., about 21 miles, for natural gas transmission. Connection will be made at latter point with natural gasoline plant of company. Construction will be carried out by company forces.

Bureau of Reclamation, Denver, asks bids until Aug. 26 for welded steel pipe lines for Gem pumping station, Gem irrigation district, Owyhee project, Oregon-Idaho (Specifications 1411-D).

Beaumont, Tex., plans steel pipe lines for municipal gas distribution, including main welded steel line for connection with supply source, comprising about 200 miles of 4 to 16-in., with control station, service connection, about 14,000 meters and other facilities. Cost estimated at $1,700,000. Surveys and estimates of cost have been made by Albert C. Moore & Co., Smith-Young Tower Building, San Antonio, Tex., consulting engineer. Proposed to arrange bond issue in amount noted.

National Refining Co., Hanna Building, Cleveland, plans new 8-in. welded steel pipe line from Coffeyville, Kan., to Winfield, Kan., about 54 miles, for crude oil transmission.

Bureau of Reclamation, Denver, closes bids Aug. 30 for two steel welded inlet pipes for units A-1 and A-2 at Boulder power plant, Boulder Canyon project (Specifications 1415-D); until Aug. 27, six steel pump-discharge pipe lines for pumping station No. 1, gravity main canal, Gila project, Ariz. (Specifications 1410-D).

Reinforcing Steel

Awards of 10,440 tons; 18,815 tons in new projects

AWARDS

ATLANTIC STATES

400 Tons, York, Pa., flood control work, to Bethlehem Steel Co., Bethlehem, Pa., through Benjamin Foster Co.
300 Tons, Hagerstown, Md., buildings for North American Cement Co., to Truscon Steel Co., Youngstown, through Nicholson Co.
250 Tons, Bradford County, Pa., highway bridge, to Bethlehem Steel Co., Bethlehem, Pa.
150 Tons, New London, Conn., submarine base, to Bethlehem Steel Co., Bethlehem, Pa., through F. H. McGraw, contractor.

SOUTH AND CENTRAL

2000 Tons, Norfolk, Va., Navy work, to Concrete Steel Co., New York, through Virginia Engineering Co., contractor.
1000 Tons, Paris Island, S. C., marine barracks, to Truscon Steel Co., Youngstown, through Charles W. Angle, Inc.
670 Tons, Montgomery, Ala., Riverside housing project, to Connors Steel Co., Birmingham.
500 Tons, Detroit, Grace Hospital buildings, to Great Lakes Steel Corp., Detroit, through Arthur O. Misch Co., through Concrete Steel Fireproofing Co.
495 Tons, Mobile, Ala., buildings for War Department, Southeast Field Air depot, to Truscon Steel Co., Youngstown, through Foster & Creighton Co. (also 135 tons mesh).
285 Tons, Rutledge, Tex., Marshall Ford Dam, Specification A-46908-A-1, to Peden Iron & Steel Co., Houston, Tex.
280 Tons, Duncan Field, Tex., War Department requirements, to Truscon Steel Co., Youngstown.
279 Tons, State of Indiana, highway projects Nos. 1997 and 1998, to Truscon Steel Co., Youngstown, through R. P. Olinger.
230 Tons, Chicago, subway section D2B, to Olney J. Dean Co., Chicago, through John C. Tully, contractor.
190 Tons, Rockford, Ind., bridge No. 1999, to Laclede Steel Co., St. Louis.
125 Tons, Jackson County, Ga., State bridge, to Truscon Steel Co., Youngstown, through Naimer Construction Co.
116 Tons, State of Indiana, highway project No. 1995, to Truscon Steel Co., Youngstown, through Deniston & Barber.
110 Tons, Hoopston, Ill., bridge, to Calumet Steel Co., Chicago Heights, Ill.

WESTERN STATES

1000 Tons, Fort Peck, Mont., power house, U. S. Engineers, to Sheffield Steel Co., Kansas City, through Woods Bros. Construction Co., contractor.
920 Tons, Frink, Calif., All-American Canal, Specification B-42493, to Judson-Pacific Co., San Francisco.
610 Tons, Fortuna, Ariz., Gila Canal, Specification 24749-A, to Bethlehem Steel Co., Bethlehem, Pa.
152 Tons, Kettle Falls, Wash., Columbia River reservoir, Specification B-38408-A, to Colorado Fuel & Iron Co., Pueblo, Colo.
150 Tons, Fairfax, Calif., enlarge Alpine Dam, to Gilmore Steel Co.
120 Tons, Palo Alto, Calif., underpass, to San Jose Steel Co., San Jose, Calif.
105 Tons, San Francisco, addition to Sisters of the Good Shepherd Convent, to Richards Dick Reinforcing Steel Co.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

8000 Tons, Hartford, Conn., Park River conduit, U. S. Engineers Office.
1400 Tons, Baltimore, Charles Perkins housing project (USHA-Md-2-3); bids taken.
400 Tons, New Bedford, Mass., housing project.
360 Tons, New York, Rapid Transit Railroad, route 110, section 10; bids Aug. 27.
220 Tons, Baltimore, dock, Maryland Drydock Co.; bids taken.
200 Tons, Cranston, R. I., sewerage pumping stations.

SOUTH AND CENTRAL

1000 Tons, Newport News, Va., piers and bulkhead, Newport News Shipbuilding & Drydock Co.; bids taken.
700 Tons, Rossford, Ohio, warehouse and factory, Libby-Owens-Ford Glass Co.; A. Bentley & Sons Co., contractor.
460 Tons, Norfolk, Va., reservoir, Specification 10004, Navy Yard; bids taken.
300 Tons, Ottumwa, Iowa, manufacturing building, Morrell & Co.; bids taken.
170 Tons, Columbus, Ohio, Mount Calvary housing project, bids Aug. 23.

WESTERN STATES

5600 Tons, Pacific Ocean Islands, Navy air bases, through Raymond Concrete Pile Co., Turner Construction Co. et al., general contractors.
175 Tons, Fresno, Calif., Roosevelt School; bids in.
125 Tons, Moffett Field, Sunnyvale, Calif., utility and laboratory buildings; bids in.
105 Tons, Fort Baker, San Francisco, for U. S. Engineer, Invitation 868-41-23; bids Aug. 21.
100 Tons, Fresno, Calif., union building for State College, J. I. Barnes Const. Co., general contractor.
100 Tons, Caspar, Wyo., underpass, general contract awarded.

Cast Iron Pipe

Oakville, Conn., has plans for a $300,000 water supply system. Bronson E. Lockwood, Litchfield Road, Watertown, Conn., is engineer.

Agawam, Mass., will build a 10-in. cast iron pressure sewer line under and across Westfield River.

Brockton, Mass., will shortly purchase 12,000 ft. of 6-in. pipe. City water commissioner is in charge.

Northampton, Mass., will replace a sizable number of water mains in various streets. Government has allotted $75,029 as part payment for the work.

Midland, Tex., plans pipe lines for water system and other water works installation. Cost about $100,000. Special election has been called to vote bonds in that amount.

Balfour-Central Falls Sanitary District, Asheboro, N. C., plans pipe lines for water supply and other water works installation; also lines for sewer system. Entire project will cost about $240,000. Right of way is being secured and work will begin soon.

Teutopolis, Ill., plans water pipe line system and other water works installation, including elevated steel tank and tower. Warren & Van Praag, Decatur, Ill., are consulting engineers.

Comanche, Iowa, has approved bond issue of $27,000 for pipe lines for water system and other water works installation. Work will begin soon.

Tecumseh, Mich., plans water pipe line system and other water works installation. Surveys and estimates of cost are being made by Pate & Hirn, Michigan Building, Detroit, consulting engineers.

Chesterton, Ind., plans pipe lines for water system and other water works installation. Cost close to $30,000. C. W. Cole, 220 West LaSalle Street, South Bend, Ind., is consulting engineer.

Torrance, Cal., W. H. Stanger, superintendent of water department, plans about 3000 ft. of 12-in. pipe for main water supply from line of Metropolitan Water District to Crenshaw and Maricopa Streets.

Seaman, Ohio, will begin work at once on pipe lines for water system and other water works installation, including 100,000-gal. elevated steel tank and tower, and pumping station. Cost about $130,000. Burgess & Niple, 568 East Broad Street, Columbus, Ohio, are consulting engineers.

Greensboro, N. C., plans pipe line extensions in water system and other water works installation; also extensions in sewage system. Entire project will cost close to $390,000. C. W. Smedberg is city manager, in charge.

Merom (Sullivan County), Ind., plans pipe lines for water system; also new 50,000-gal. elevated steel tank and tower, deep-well pumping machinery and accessories, and other water works installation. D. W. Carpenter, Hillsboro, Ind., is consulting engineer.

Youngsville, Pa., plans pipe line for extensions in water system, including new main line from borough limits to Mead Creek water source. Hill & Hill, 24 Main Street, North East, Pa., are consulting engineers.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes[2]	3.80¢		3.80¢									4.55¢			
Wrought iron	4.75¢														
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢		
TIN PLATE Standard cokes (Per 100-lb. base box)	$5.00	$5.00	$5.00						$5.10						
BLACK PLATE 29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (ia)			
TERNES, M'FG Special coated (Per base box)	$4.30		$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢					2.40¢	2.70¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢		
Reinforcing (rail)[7]	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢				2.40¢	2.45¢	2.15¢		
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢							2.70¢		
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Coatesville and Claymont = 2.10¢)		2.45¢	2.65¢		2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE[9]															
Bright	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)								
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)								
Spring	3.20¢	3.20¢		3.20¢	3.20¢		(Worcester = 3.30¢)								
PILING Steel sheet	2.40¢	2.40¢				2.40¢					2.85¢	2.95¢			
IRON BARS															
Common		2.25¢			(Terra Haute, Ind. = 2.15¢)										
Refined	3.75¢														
Wrought	4.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to 29 gage within certain width and length limitations. [6] For merchant trade. [7] Straight lengths as quoted by distributers. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lots to manufacturing trade. [10] Boxed.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

	Per Gross Ton
3 in to 8 in.	$54.00
8 in. to 12 in.	52.00
12 in to 18 in.	54.00
18 in. and over	56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the making of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	*Per Lb.*
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., $3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cut nails, carloads	3.85

	Base per 100 Lb.
Annealed fence wire	$3.05

	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	56
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. and 6 in. and smaller	68½
Larger and longer up to 1 in.	66
1⅛ in. and larger	64
Lag bolts	66
Plow bolts, Nos. 1, 2, 3, and 7	68½
Hot pressed nuts; c.p.c., t-nuts; square, hex., blank or tapped:	
½ in. and smaller	67
9/16 in. to 1 in. inclusive	64
1⅛ in. to 1½ in. inclusive	62
1⅝ in. and larger	60

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts	U.S.S.	S.A.E.
½ in. and smaller	67	70
9/16 to 1 in.	64	65
1⅛ in. through 1½ in.	62	62
1⅝ in. and larger	60	60

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	75 and 10
Stove bolts in packages, with nuts attached	75
Stove bolts in bulk	83½

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York, lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.40

Small Rivets

(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 10

Cap and Set Screws

	Per Cent Off List
Milled hexagon head, cap screws, 1 in. dia. and smaller	50 and 10
Milled headless set screws, cut thread ¼ in. and larger	64
3/16 in. and smaller	73
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	70
Upset set screws, cup and oval points	75
Milled studs	52

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Aug. 14	Aug. 15	Aug. 16	Aug. 17	Aug. 19	Aug. 20
Copper, Electrolytic[1]	11.00	11.00	11.00	11.00	11.00	11.00
Copper Lake	11.00	11.00	11.00	11.00	11.00	11.00
Tin, Straits, New York	50.75	50.75	50.75	....	50.75	50.75
Zinc, East St. Louis[2]	6.25	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis[3]	4.60	4.60	4.60	4.60	4.60	4.60

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

	New York	Cleveland
Tin		
Straits pig	51.75	53.75
Copper		
Electro	12.25	12.125
Castings	12.50	11.875
H. R. sheets*	19.62	19.62
Seamless tubes*	20.12	20.12
Brass		
Yellow, sheets*	18.23	18.23
Yellow, rods*	13.26	13.26
Seamless tubes*	20.98	20.98
Zinc		
Slabs	7.60	7.75
Sheets, No. 9 casks	12.00	12.00
Lead		
American pig	5.85	5.25
Bar	7.80	8.00
Cut sheets	8.00	8.00
Antimony		
Asiatic	16.00	17.00
Aluminum		
Virgin, 99%	20.00	21.00
No. 1 remelt., 98-99%	18.00	18.50
Solder		
½ and ½	31.25	32.50
Babbitt		
Anti-friction grade	22.00	22.00

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper		
Hvy. crucible	8.625	9.25
Hvy. and wire	7.625	8.00
Light and bottoms	6.625	7.125
Brass		
Heavy	4.750	5.255
Light	3.750	4.50
No. 1 yel. turn	4.50	5.50
No. 1 red or compo. turnings	6.875	7.375
Hvy. Mach. compo.	7.125	7.75
Lead		
Heavy	3.875	4.250
Aluminum		
Cast	8.00	9.00
Sheet	13.00	14.00
Zinc	3.25	4.00

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 18c.-19c. a lb.; No. 12 remelt No. 2 standard, 18c.-19c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, $183-$185 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 11.75c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33⅓; on brass sheets and rods, 40; on brass tubes, 33⅓, and copper tubes, 40.

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem.....$54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade ..... 2.70c.
Delivered, Detroit ..... 2.80c.

S.A.E. Series Numbers	Alloy Differential, per 100 Lb.
2000 (1.5 Ni)	$0.35
2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.55
2500 (5 Ni)	2.25
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)	0.75
x4340 Cr-Ni-Mo	1.65
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.10
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)	2.60
6100 Cr-V bar	1.20
6100 Cr-V spring steel	0.35
Cr-Ni-V	1.50
C-V	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c., carlots.

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
H't strip	17.00c.	17.50c.	24.00c.	35.00c.
C'ld st.	22.00c.	22.50c.	32.00c.	52.00c.

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb.
High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

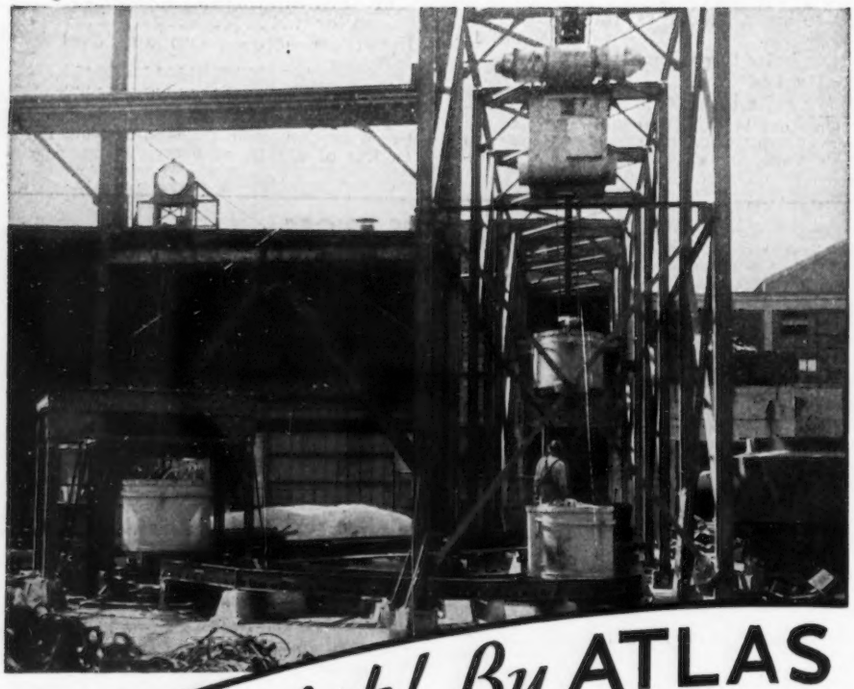
	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago.



An Assist! By ATLAS

View at Prominent Iron Foundry

To Lower Costs!

Here Atlas - designed, Atlas - built equipment moves heavy scrap and other charging materials with consummate ease.

Monorail deposits empty bucket on roller conveyor. Bucket *rolls down* to scale platform, is charged with iron, weight read from yard crane cab. Scale platform lowers, turns, bucket *rolls down* to monorail for pick-up and charge to cupola.

A propitious circle, presaging profit at the year-end—and a definitely typical Atlas installation.

THE ATLAS CAR & MFG. CO.

Engineers **CLEVELAND, OHIO** ***Manufacturers***

serving the world with mobile handling equipment

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall.

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld, Hot Rolled
1 in. o.d. 13 B.W.G.	$9.01	$7.82	....
1¼ in. o.d. 13 B.W.G.	10.67	9.26	....
1½ in. o.d. 13 B.W.G.	11.70	10.23	$9.72
1¾ in. o.d. 13 B.W.G.	13.42	11.64	11.06
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d. 13 B.W.G.	16.76	14.54	13.79
2¼ in. o.d. 12 B.W.G.	18.45	16.01	15.16
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d. 12 B.W.G.	21.42	18.59	17.54
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66
4½ in. o.d. 10 B.W.G.	43.04	37.35	35.22
5 in. o.d. 9 B.W.G.	54.01	46.87	44.25
6 in. o.d. 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought iron pipe)

Base Price=$200 Per Net Ton

Butt Weld

Steel	Black	Galv.
⅛ in.	56	36
¼ to ⅜ in.	59	43½
½ in.	63½	54
¾ in.	66½	58
1 to 3 in.	68½	60½

Wrought Iron	Black	Galv.
¼ and ⅜ in.	+9	+30
½ in.	24	6½
¾ in.	30	13
1 and 1¼ in.	34	19
1½ in.	38	21½
2 in.	37½	21

Lap Weld

Steel		
2 in.	61	52½
2½ and 3 in.	64	55½
3½ to 6 in.	66	57¼
7 and 8 in.	65	55½
9 and 10 in.	64½	55
11 and 12 in.	63½	54
Wrought Iron		
2 in.	30½	15
2½ to 3½ in.	31½	17½
4 in.	33½	21
4½ to 8 in.	32½	20
9 to 12 in.	28½	15

Butt weld, extra strong, plain ends

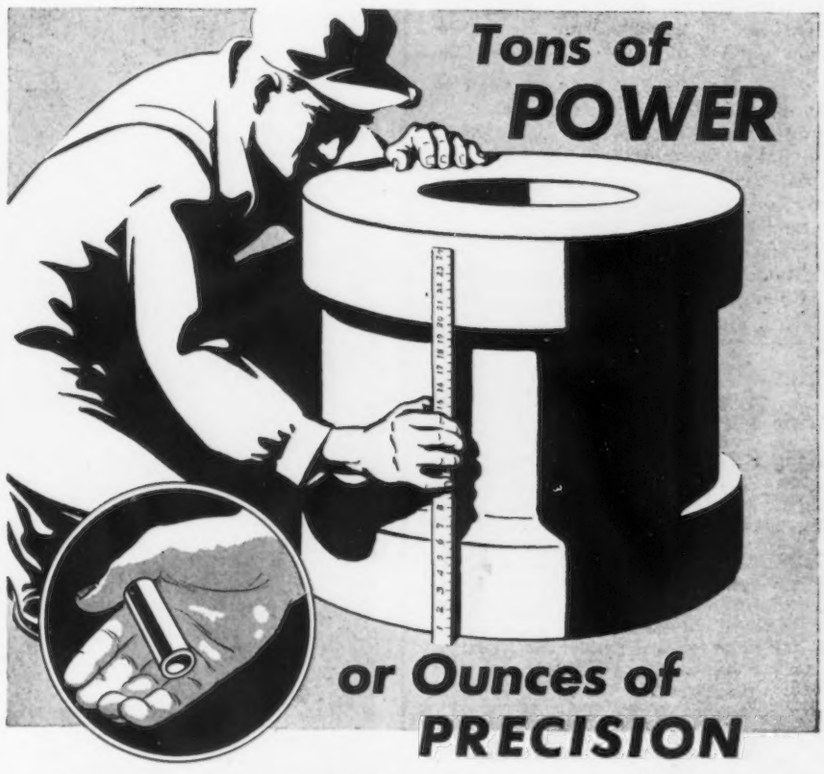
Steel	Black	Galv.
⅛ in.	54½	41½
¼ to ⅜ in.	56½	45½
½ in.	61½	53½
¾ in.	65½	57½
1 to 3 in.	67	60
Wrought Iron		
¼ and ⅜ in.	+10	+43
½ in.	25	9
¾ in.	31	15
1 to 2 in.	38	22½

Lap weld, extra strong, plain ends

Steel		
2 in.	59	51½
2½ and 3 in.	63	55½
3½ to 6 in.	66½	59
7 and 8 in.	65½	56
9 and 10 in.	64½	55
11 and 12 in.	63½	54
Wrought Iron		
2 in.	33½	18½
2½ to 4 in.	39	25½
4½ to 6 in.	37½	24
7 and 8 in.	38½	24½
9 to 12 in.	32	20½

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.



AMPCO METAL Serves Both!

The screw-down nut in a blooming mill weighs about 3500 lbs. It stands the continuous, smashing impact of reducing massive steel ingots in modern high-speed rolling mills. The small bushing, used in a precision lathe, must maintain accuracy within .0005 of an inch, through years of service. These extremes suggest the wide application of AMPCO METAL in industry.

CAN IT SERVE YOU?

AMPCO METAL is supplied in many grades. It is a bronze without equal in its combination of high strength and resistance to wear, fatigue and corrosion. Write for complete specifications and engineering data.

AMPCO METAL, INC.
Dept. IR-822 Milwaukee, Wis.

AMPCO METAL
The Metal Without An Equal
AMPCO

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, bessemer, 51.50%.. $4.75
Old range, non-bessemer, 51.50% 4.60
Mesaba, bessemer, 51.50%.... 4.60
Mesaba, non-bessemer, 51.50% 4.45
High phosphorus, 51.50%..... 4.35

Foreign Ores*

C.i.f. Philadelphia or Baltimore, Exclusive of Duty

Per Unit

Algerian, low P, Cu free, dry, 55 to 58% Fe.....12c.

Caucasian, washed, 52% Mn.....60c.
African, Indian, 44 to 48% Mn...50c.
African, Indian, 49 to 51% Mn...55c.
Brazilian, 46 to 48% Mn.....53c.
Cuban, del'd, duty free, 51% Mn. 72c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered.....$23.50
Tungsten, domestic scheelite, delivered 23.50
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton:
South African (low grade)...Nom.
Rhodesian, 45% $23.50
Rhodesian, 48% 27.50

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton $40.00
Angle bars, 100 lb..... 2.70

F.o.b. Basing Points

Light rails (from billets), gross ton $40.00
Light rails (from rail steel), gross ton 39.00

Base per Lb.

Cut spikes ..... 3.00c.
Screw spikes ..... 4.55c.
Tie plates, steel ..... 2.15c.
Tie plates, Pacific Coast..... 2.30c.
Track bolts, steam railroads... 4.15c.
Track bolts, discount to jobbers all sizes (per 100 counts)... 65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail.....$20.00 to $21.00
Domestic, f.o.b. Ohio River landing barges .....$20.00 to $21.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines..$20.50 to 21.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid....$25.00 to $25.50
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....$31.00
As above, in bags, f.o.b. same mines $32.60

REFRACTORIES

Fire Clay Brick

Per 1000 f.o.b. Works

Super-duty brick, at St. Louis..$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois 47.50
First quality, New Jersey..... 52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois..... 42.75
Second quality, New Jersey.... 49.00
No. 1 Ohio 39.90
Ground fire clay, per ton..... 7.10

Silica Brick

Pennsylvania $47.50
Chicago District 55.10
Birmingham 47.50
Silica cement, net ton (Eastern) 8.55

Chrome Brick

Net per Ton

Standard f.o.b. Baltimore, Plymouth Meeting and Chester...$50.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. 50.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester $72.00
Chemically bonded, f.o.b. Baltimore 61.00

Grain Magnesite

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)..... (—)*
Domestic, f.o.b. Baltimore and Chester in sacks $40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk) 22.00

*None available.

ACCURACY
is vital
HERE
FLYING
TO PROPER
THE ELECTRIC CONTROLLER & MFG. CO.
E&M
CLEVELAND, OHIO
HEAVY DUTY MOTOR CONTROL FOR CRANES, MILL DRIVES AND MACHINERY • BRAKES • LIMIT STOPS • LIFTING MAGNETS AND AUTOMATIC WELD TIMERS
EC&M Magnetic CONTROLLERS for operating new FRETZMOON TUBE MILL, recently installed. All magnetic contactors on these controllers are of EC&M LINE-ARC design, insuring long contact-life and eliminating destructive burning on the arc shields.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

Per Gross Ton, Delivered, Lump Size

50% (carload lots, bulk).....$74.50*
50% (ton lots, packed)..... 87.00*
75% (carload lots, bulk).....135.00*
75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio

10.00 to 10.50%.....$33.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, F.o.b. Jackson, Ohio

5.00 to 5.50%.....$27.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon.....11.00c.
2% carbon .....17.50c.
1% carbon .....18.50c.
0.10% carbon .....20.50c.
0.06% carbon .....21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon $113.00*
2.50% carbon 118.00*
2% carbon 123.00*
1% carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload..... $2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V., del'd $2.70 to $2.90†
Ferracolumbium, per lb. contained columbium, f. o. b. Niagara Falls, N. Y., ton lots ..... $2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace, carload and contract, per net ton.....$142.50

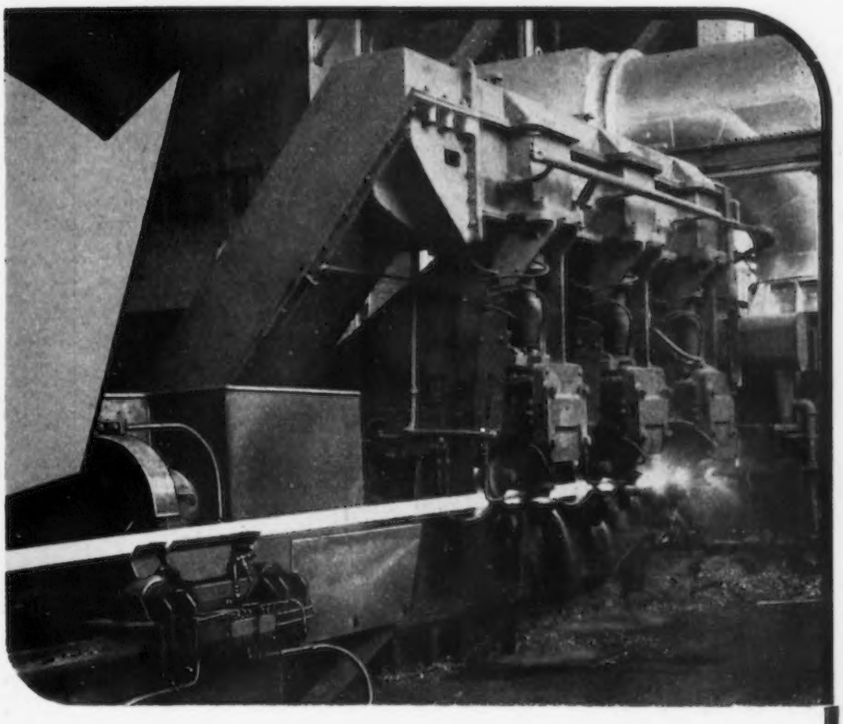
*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton.....$157.50
Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton $58.50
Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville $75.00
Ferromolybdenum, per lb. Mo, f.o.b. furnace..... 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace ..... 80c.
Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

FUEL OIL

Per Gal.

No. 3, f.o.b. Bayonne, N. J.....4.75c.
No. 6, f.o.b. Bayonne, N. J.....3.21c.
No. 5 Bur. Stds., del'd Chicago..3.25c.
No. 6 Bur. Stds., del'd Chicago..2.75c.
No. 3 distillate, del'd Cleveland.5.25c.
No. 4 industrial, del'd Cleveland.5.00c.
No. 5 industrial, del'd Cleveland.3.75c.
No. 6 industrial, del'd Cleveland.3.25c.



SAW CUTS TUBE
LENGTH under EC&M CONTROL

THE white hot tube glides along—one continuous piece of perfectly formed tubing — to be cut into specified lengths of pipe.

The flying saw must travel with the tubing when it cuts—then return to its normal position, ready for the next cut.

This operation of the saw-motor is governed by EC&M Control. Accuracy is vital here. Under the EC&M system of control, all pipes are cut uniform in length and exactly to specifications.

This is typical of EC&M Control—engineered to the task. Put your motor control problems up to EC&M.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt .....$4.50 to $4.75

Foundry, f.o.b. Connellsville, prompt .....$5.25 to 5.50

F'dry, by-product, Chicago.... 10.50

F'dry, by-product, New England 12.50

Foundry, by-product, Newark or Jersey City .....$11.30 to $11.90

F'dry, by-product, Philadelphia 11.13

F'dry, by-product, Cleveland... 11.05

F'dry, by-product, Cincinnati.. 10.50

Foundry, Birmingham 7.50

F'dry, by-product, St. Louis $10.75 to $11.00

Foundry, from Birmingham, f.o.b. cars dock Pacific ports.....$14.75

BRITISH

British

Per Gross Ton, f.o.b. United Kingdom Ports

Ferromanganese, export. £17 18s.

Tin plate, per base box 32s. to 33s.

Steel bars, open hearth £13 9s.

Beams, open hearth.... £12 2s. 6d.

Channels, open hearth.. £12 2s. 6d.

Angles, open hearth.... £12 2s. 6d.

Black sheets, No. 24 gage £18 17s. 6d. max.*; £18 17s. 6d. min.**

Galvanized sheets, No. 24 gage £19 10s. max.*; £19 10s. min.**

*Empire markets only.
**Other than Empire markets.

PIG IRON (Per Gross Ton)

Prices delivered various consuming points indicated by bold italics

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston	***$24.50***	***$24.00***	***$25.50***	***$25.00***	.....
Brooklyn	***26.50***	.....	.....	***27.00***	.....
Jersey City	***25.53***	***25.03***	***26.53***	***26.03***	.....
Philadelphia	***24.84***	***24.34***	***25.84***	***25.34***	.....
Bethlehem, Pa.	$24.00	$23.50	$25.00	$24.50	.....
Everett, Mass.	24.00	23.50	25.00	24.50	.....
Swedeland, Pa.	24.00	23.50	25.00	24.50	.....
Steelton, Pa.	.....	23.50	.....	.....	28.50
Birdsboro, Pa.	24.00	23.50	25.00	24.50	28.50
Sparrows Point, Md.	24.00	23.50	.....	.....	.....
Erie, Pa.	23.00	22.50	24.00	23.50	.....
Neville Island, Pa.	23.00	22.50	23.50	23.00	.....
Sharpsville, Pa.	23.00	22.50	23.50	23.00	.....
Buffalo	23.00	22.00	24.00	23.50	28.50
Cincinnati	***23.44***	***23.61***	.....	***24.11***	.....
Canton, Ohio	***24.39***	***23.89***	***24.89***	***24.39***	.....
Mansfield, Ohio	***24.94***	***24.44***	***25.44***	***24.94***	.....
St. Louis	***23.50***	***23.02***	.....	.....	.....
Chicago	23.00	22.50	23.50	23.00	.....
Granite City, Ill.	23.00	22.50	23.50	23.00	.....
Cleveland	23.00	22.50	23.50	23.00	.....
Hamilton, Ohio	23.00	22.50	.....	23.00	.....
Toledo	23.00	22.50	23.50	23.00	.....
Youngstown	23.00	22.50	23.50	23.00	.....
Detroit	23.00	22.50	23.50	23.00	.....
St. Paul	***25.63***	.....	***26.13***	***25.63***	.....
Duluth	23.50	.....	24.00	23.50	.....
Birmingham	19.38*	18.00	24.00	.....	.....
Los Angeles, San Francisco and Seattle	***27.50***	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....
Montreal†	27.50	27.50	.....	28.00	.....
Toronto†	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fce.....$22.50

CHARCOAL

Lake Superior fce.....$27.00
Delivered Chicago 30.34

Base prices are subject to an additional charge for delivery within the switching limits of the respective districts.

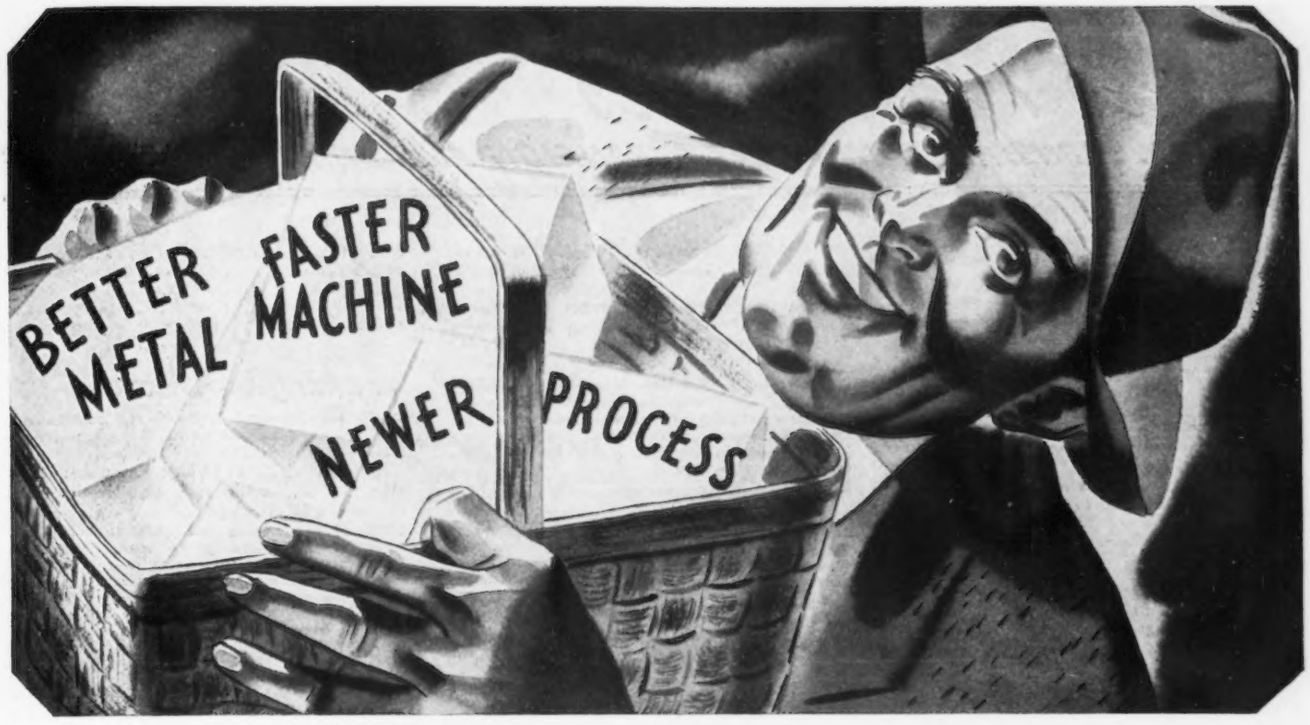
*Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over. †On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

WAREHOUSE PRICES

(Base Prices, Dollars per 100 lb., Delivered Metropolitan Areas)

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled	$3.15	$3.05	$3.15	$3.35	$3.38	$3.23	$3.05	$3.51	$3.45	$3.18	$3.30	$3.48	$4.30
Sheets, cold rolled	....	4.10	4.05	4.05	4.40	4.30	4.30	4.58	....	4.12	4.35	4.43	6.50
Sheets, galvanized	4.75	4.60	4.42	4.75	4.30	4.64	4.00	4.66	4.75	4.95	4.75	4.98	5.25
Strip, hot rolled	3.40	3.40	3.30	3.75	3.76	3.48*	3.62	3.86	3.70	3.52	3.65	3.73	....
Strip, cold rolled	3.20	3.30	3.20	3.31	3.31	3.20	3.22	3.26	....	3.41	3.83	3.54	....
Plates	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.35	3.47	3.80	3.68	4.00
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	3.47	3.80	3.68	4.00
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.62	3.75	3.63	4.15
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.20	7.10	7.30	7.31	7.35	7.42	7.10	7.50	....	7.47	7.45	7.33	9.40
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.15	8.15	8.15	8.56	8.59	8.45	8.15	8.63	....	8.52	8.84	8.38	10.65
Bars, cd. drn. SAE 3100	6.75	6.75	6.75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6.98	9.80

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb.; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 150 to 499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 150 to 1049 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, $3.23.



They'll be Shopping for
NEW AIDS TO PRODUCTION
AT THE NATIONAL METAL EXPOSITION

Speed is the keynote of the government's ten billion dollar emergency program—a big factor in determining which plants will receive a share of the mammoth defense orders to be placed this fall. For this reason, new aids to production are vitally necessary to the thousands of industrial plants which are competing for this business.

If you have a new aid to production—a better metal . . . a faster machine . . . a newer process—*now* is the time to capitalize on it. And the fastest, most economical way to bring it to the attention of the men you must sell is through an exhibit in the National Metal Exposition at Cleveland, Oct. 21-25.

For these men will flock to the National Metal Exposition and Congress by the thousands, as they did at Chicago last year, to look for the products they need . . . to compare . . . to analyze . . . and to *buy*.

Over 275 leading manufacturers have already reserved space in this biggest annual Aid to Production Exposition . . . a few choice spaces are still available. Write or wire collect today for floor plan and full details. Address: W. H. Eisenman, Managing Director, National Metal Exposition, 7301 Euclid Avenue, Cleveland, Ohio.

Cooperating Societies

American Society for Metals, American Welding Society, The Wire Association, Iron & Steel Division and Institute of Metals Division, American Institute of Mining & Metallurgical Engineers.

The WORLD'S GREATEST EVENT IN THE METAL INDUSTRY 70% NEW ATTENDANCE EACH YEAR

NATIONAL METAL EXPOSITION

AND METAL CONGRESS

OCTOBER 21-25, 1940 *Cleveland, Ohio*

MANAGED BY AMERICAN SOCIETY FOR METALS

Sales Possibilities

. . . CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic

• **Refining, Inc.,** 30-30 Northern Boulevard, Long Island City, refined vegetable oil products, has let general contract to Robert H. Pinnix, Gastonia, N. C., for one-story branch plant on North Tryon Street, Charlotte, N. C., 53 x 105 ft. Cost close to $75,000 with equipment. J. N. Pease, 1236 East Morehead Street, Charlotte, is architect.

Universal Atlas Cement Co., 135 East Forty-second Street, New York, plans expansion and improvements in branch mill at Hudson, N. Y., including equipment. Cost close to $125,000 with machinery.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until Aug. 29 for 500 to 6000 60-mm. mortars and mounts (Circular 58); until Aug. 30, 1000 to 1750 37-mm. gun barrels (Circular 75); until Sept. 3, 250 to 2500 81-mm. mortars and mounts (Circular 73).

Berst-Forster-Dixfield Co., 155 East Forty-fourth Street, New York, tissue and other paper stocks, waxed and processed papers, has let general contract to Wright & Morrison, Inc., Burlington, Vt., for two-story addition to mill at Plattsburg, N. Y. Cost about $50,000 with equipment.

Chicago Pneumatic Tool Co., 6 East Forty-second Street, New York, has leased one-story building, 75 x 90 ft., to be erected by Penn Rettig, 1920 Woodbury Street, Houston, Tex., at 1810-16 Texas Avenue, Houston, for new factory branch, storage and distributing plant. Cost close to $40,000 with equipment. Chase & Stone, 911 Stuart Street, Houston, are architects. Houston offices of company are in M. & M. Building.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 27 for cast bronze pipe flanges (Schedule 2709), goggles, frames, lenses, shields and helmets (Schedule 2713) for Brooklyn and Mare Island Navy yards; iron anchors and boat grapnels (Schedule 2546) for Brooklyn, Sewall's Point, Va., Mare Island and Puget Sound yards; until Aug. 30, thermometers and sockets (Schedule 2749) for Brooklyn yard.

Bakelite Corp., 247 Park Avenue, New York, plastic products, has let general contract to M. T. Pedersen & Sons, 280 Hobart Street, Perth Amboy, N. J., for two-story addition, 80 x 260 ft., to branch plant at Bound Brook, N. J. Cost close to $100,000 with equipment, instead of smaller amount previously noted. Francisco & Jacobus, 511 Fifth Avenue, New York, are architects and engineers.

Aviation Mfg. Corp., 420 Lexington Avenue, New York, Vultee Aircraft, Inc., division, plans expansion and improvements in plant of Stinson Aircraft Division of same parent company, now being taken over and consolidated, at Nashville, Tenn., including several one-story additions for parts production and assembling, plant to be developed later for manufacture of military airplanes, as well as present Stinson aircraft. Cost over $1,500,000 with equipment. Stinson plant at Wayne, Mich., will be used largely for parts production.

Carter Products, Inc., 300 Communipaw Avenue, Jersey City, N. J., drug and pharmaceutical products, has engaged Albert Kahn, Inc., New Center Building, Detroit, architect and engineer, to prepare plans for new one-story plant, about 100,000 sq. ft. floor space, on 18-acre tract in North Brunswick Township, N. J., recently purchased. Cost about $500,000 with equipment.

John A. Roebling's Sons Co., South Broad Street, Trenton, N. J., wire rope, cable, etc., has approved plans for one-story factory branch, storage and distributing plant, 50 x 240 ft., at 6210 Navigation Boulevard, Houston, Tex., superstructure to begin at once. Cost over $60,000 with equipment. C. M. Davis, Dan Waggoner Building, Fort Worth, Tex., is architect.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Aug. 26 for 21,130 metal parts for fuze units (Circular 253).

Philadelphia Electric Co., 1000 Chestnut Street, Philadelphia, has approved plans for further expansion in steam-electric generating plant at Chester, supplementing extension program now in progress, to cost close to $7,000,000. New York will include installation of an 80,000-kw. turbine-generator unit for which award has been made to Westinghouse Electric & Mfg. Co., East Pittsburgh. Contracts for other equipment will be let soon. Cost about $5,000,000 with machinery. United Engineers & Constructors, Inc., 1401 Arch Street, is engineer.

Harrisburg Steel Corp., Herr Street, Harrisburg, Pa., plans one-story addition, primarily for production of forgings for aerial bombs. Cost over $450,000 with machinery. Ford, Bacon & Davis, Inc., 39 Broadway, New York, is consulting engineer.

Silent Hoist Winch & Crane Co., 841-865 63rd Street, Brooklyn, states that item on page 106, Aug. 8 issue, that it is building a new plant at Milford, Conn., gives a wrong impression. New plant is for Milford Crane & Machine Co., which is affiliated with Silent Hoist Winch & Crane Co. as a sales and service organization in New England. Silent Hoist Winch & Crane Co. will continue to operate its plant in Brooklyn.

Buffalo District

• **Buffalo Foundry & Machine Co.,** 1543 Fillmore Avenue, Buffalo, has let general contract to Crooker, Carpenter & Skaer, Inc., 120 Hardwood Place, for one-story shop addition, 45 x 175 ft. Cost close to $50,000 with equipment.

Byrne Brewery, Inc., Niagara Falls, N. Y., care of John G. Byrne, Williamsville, Buffalo, recently organized by Mr. Byrne and associates, has acquired Niagara Falls Brewery, Third Street, Niagara Falls, closed for some time, and will modernize for early resumption of operations. Mr. Byrne was formerly executive vice-president and general manager of Downs Brewery Co., Buffalo, and will head new company; Noel R. Hueber and Richard P. Byrne, both Syracuse, N. Y., will be treasurer and secretary, respectively.

Rathbun Molding Corp., Salamanca, N. Y., plastic products, plans one-story addition. Cost close to $45,000 with equipment.

New England

• **Hamilton Standard Propeller Division,** United Aircraft Corp., East Hartford, Conn., has asked bids on general contract for one-story addition, 80 x 300 ft. Cost over $200,600 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Commanding Officer, Ordnance Department, Watertown Arsenal, Watertown, Mass., will take bids soon for machine tools; also for carriages for 90 and 37-mm. guns.

Orford Soap Co., Manchester, Conn., subsidiary of Bon Ami Co., 17 Battery Place, New York, has let general contract to Bartlett-Brainard Co., 16 Van Dyke Avenue, Hartford, Conn., for new one-story manufacturing unit, 120 x 150 ft., and three-story storage and distributing building, 75 x 115 ft. Cost about $100,000 with equipment. Buck & Buck, 650 Main Street, Hartford, are consulting engineers.

Wadsworth, Howland & Co., Inc., Green Street, Malden, Mass., paints, varnishes, oils, etc., plans four-story and basement addition, and improvements in present plant. Cost over $85,000 with equipment. Francisco & Jacobus, 511 Fifth Avenue, New York, are architects and engineers.

Washington District

• **Virginia Electric & Power Co.,** Richmond, Va., plans expansion and improvements in steam-electric generating station at Norfolk, Va., including new 40,000-kw. turbine-generator unit and accessories, high-pressure boilers and auxiliary equipment. Cost close to $4,000,000. Company also plans early joint construction of new power transmission line with Virginia Public Service Co., Charlottesville, Va., extending from power station of latter company at Hampton, Va., to generating plant of Virginia Electric company at Richmond. Cost about $2,000,000.

General Purchasing Officer, Panama Canal, Washington, asks bids until Aug. 26 for four hydraulic jacks; four cylinders and pistons, with flange studs and nuts, gaskets, gland studs, piston and cylinder bearings, cap screws, retainer rings, clamping rings, etc.; four top bases; parts and accessories for jacks (Schedule 4245); until Aug. 27 for two motor-driven, floor grinding machines (Schedule 4247).

Westinghouse Electric & Mfg. Co., East Pittsburgh, plans one-story addition, about 35,000 sq. ft. floor space, to radio equipment plant, 2519 Wilkens Avenue, Baltimore. Cost close to $60,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, has appropriation of $10,500,000 for fuel oil, diesel engine oil and gasoline storage facilities at different locations, including purchase of land, steel tanks, pumping machinery and other equipment. Also fund of $6,500,000 for additional aviation shore facilities at Hawaiian Islands, including steel hangars, shops and other structures.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 27 for steel oil fillers, one quart, ¾-pint and ½-pint capacities (Schedule 2712), 33,830 galvanized iron conduit bushings (Schedule 2704); boiler water testing equipment and spare parts (Schedule 2761); until Aug. 30, lubricating gun fittings, pressure type (Schedule 2736) for Sewall's Point, Va., and Mare Island yards; one vertical, cylindrical, pit-type electric furnace (Schedule 2729); until Aug. 27, 500 seamless steel cylinders (Schedule 2689), dry batteries and flashlight batteries (Schedule 2681), 600 acetylene cylinders (Schedule 2690) for Eastern and Western yards.

South Central

• **Constructing Quartermaster,** Southeast Air Depot, Mobile, Ala., asks bids until Aug. 29 for one-story aircraft repair shop for Air Corps at local station.

Spearman Concrete Pipe Co., Hiwassee Avenue, Knoxville, Tenn., plans one-story machine shop to replace a structure recently destroyed by fire. Cost close to $60,000 with equipment.

Water Works Board, Gadsden, Ala., J. C. Inzer, chairman, asks bids until Sept. 3 for water filtration plant for municipal waterworks. Wiedeman & Singleton, Candler Building, Atlanta, Ga., are consulting engineers.

W. G. Avery Body Co., Fernwood, Miss., automobile bodies and parts, has approved plans for rebuilding part of plant recently destroyed by fire. Cost close to $45,000 with equipment.

Buckeye Cotton Oil Co., Memphis, Tenn., has approved plan for one-story addition for storage and distribution. Cost about $50,000 with equipment.

Don't let Eye-Injuries

SABOTAGE

Your Plant★★★

★ put up the AMERICAN Line of Defense

PREPAREDNESS demands that every minute of the working day be "filled with 60 seconds' worth of duty done." And that calls for full preparedness against every eye-hazard that can *sabotage* production by losing time . . . tying up working dollars . . . spoiling work in process . . . piling up waste.

NOW is the time to see to it that *your* plant is completely protected against the *un-American activities* of uncontrolled eye-hazards. Secure your defenses by keeping every eye out of harm's way . . . behind a pair of comfortable American Optical Goggles fitted with deep-curved, *extra-strong* Super Armorplate Lenses. For today it's even more than good economy . . . *it's a vital public service* . . . to:

***AMERICANIZE* Your Workers' Eyes**

AO Ful-Vue Goggle is Patented

American Optical Company

SOUTHBRIDGE, MASSACHUSETTS

MANUFACTURERS, FOR MORE THAN 100 YEARS, OF PRODUCTS TO AID AND PROTECT VISION

7590

Southwest

● **Herman Body Co.,** 4420 Clayton Avenue, St. Louis, automobile bodies and parts, has let general contract to Murch-Jarvis Co., Inc., Railway Exchange Building, for one-story addition, 110 x 150 ft., for general service. Cost over $65,000 with equipment. H. S. Van Hoefen, Railway Exchange Building, is architect.

Tulsa Tractor & Supply Co., 112 South Elgin Street, Tulsa, Okla., farm tractors and allied equipment, and C. C. Forrester Welding Co., 116 South Elgin Street, adjoining, plan rebuilding plants recently destroyed by fire. Combined loss about $100,000 with equipment.

John Deere Plow Co., 2212 North Broadway, St. Louis, agricultural implements, has asked bids on general contract for one-story addition, 25 x 230 ft., to local factory branch, storage and distributing plant. Cost over $70,000 with equipment. Main offices are at Moline, Ill.

Stearman Aircraft Co., Wichita, Kan., has let general contract to Walter Armogost, Kauffman Building, for four one-story additions, 100 x 122 ft., for assembling divisions; two 50 x 112 ft., each, for parts and shop service; and 100 x 122 ft., for storage and distribution. Cost over $100,000 with equipment. Overend & Boucher, Brown Building, are architects.

National Slug Rejector, Inc., 5505 Natural Bridge Avenue, St. Louis, coin machine mechanisms for rejecting slugs, has let general contract to Murch-Jarvis Co., Inc., Railway Exchange Building, for one and two-story addition, 111 x 175 ft. Cost close to $90,000 with equipment. H. S. Van Hoefen, Railway Exchange Building, is architect.

Western Pa. District

● **Aluminum Co. of America, Inc.,** Gulf Building, Pittsburgh, has approved plans for expansion in branch at Mobile, Ala., operated under name of Aluminum Ore Co., to increase alumina production capacity about 50 per cent. Work will include several one-story additions, with shop units, calcining kiln, 16 precipitator tanks, storage and distributing buildings, and other structures. Cost reported over $200,000 with equipment.

Mine Safety Appliances Co., 201 North Braddock Avenue, Pittsburgh, has let general contract to David T. Riffle, 1006 Forbes Street, for two-story addition, 60 x 175 ft. Cost over $50,000 with equipment. Prack & Prack, Martin Building, are architects.

Ohio and Indiana

● **Apex Machine & Tool Co.,** 501 East Third Street, Dayton, Ohio, universal joints, socket wrenches and other tools, has let general contract to Henry Stock & Son, 26 North Ludlow Street, for new one-story plant, about 23,000 sq. ft. of floor space, on South Patterson Boulevard. Cost over $60,000 with equipment. Geyer & Neuffer, Ludlow Arcade Building, are architects.

Village Council, Spencerville, Ohio, plans extensions and improvements in municipal power plant, including additional equipment. Cost about $75,000. Walter E. Metzger, 48 Chatham Road, Columbus, Ohio, is consulting engineer.

Old Fort Mills, Inc., North Grand and George Streets, Marion, Ohio, soybean products, has approved plans for two-story and basement processing plant, to replace a unit destroyed by fire a few months ago. Cost over $100,000 with equipment.

Westinghouse Electric & Mfg. Co., East Pittsburgh, plans two-story top addition to present one-story building at electric refrigerator works at Mansfield, Ohio, continuing expansion program now under way at that plant. Cost over $85,000 with equipment.

H. Leff Electric Co., 5123 Woodland Avenue, Cleveland, electrical products, has let general contract to H. L. Voker Co., 5300 Chester Avenue, for two-story and basement addition, 50 x 130 ft., for expansion in production division, storage and distribution. Cost about $85,000 with equipment.

Bastian-Morley Co., Truesdell Avenue, Laporte, Ind., manufacturer of electric and gas water heaters, parts, etc., has let general contract to Larson-Danielson Construction Co., Laporte, for one-story addition, 135 x 200 ft. Cost close to $100,000 with equipment.

South Atlantic

● **Babcock Aircraft Corp.,** Deland, Fla., Major Fred L. Foster, president, has plans for new plant on 10-acre tract at municipal airport on Daytona Beach Highway, comprising two main one-story buildings, each about 80 x 260 ft., for parts production and assembling. Other structures will be built later. Cost over $100,000 with equipment. Company has purchased property of Rover Aircraft Motors, Inc., Dayton, Ohio, including machinery and tools, and will remove to plant at Deland, where division will be established for production of airplane engines and parts. One-story extension to new plant will be built soon for this purpose.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 3 for five gasoline engine-driven arc welding sets for Charleston, S. C., Naval Station and other navy yards (Schedule 2744).

Michigan District

● **Dow Chemical Co.,** Midland, Mich., plans expansion at Dowmetal plant at Bay City, Mich., including four one-story units, about 120,000 sq. ft. of floor space in all. Program will include an extension, 100 x 200 ft., to new foundry building, on which work was begun a few weeks ago; addition, 200 x 400 ft., for expansion in core oven division; addition, 80 x 140 ft. for pattern shop and extension, 60 x 120 ft., for office and operating service. Later it is proposed to build another addition to foundry, about same size noted. Work on initial structure will begin early in fall. Cost over $850,000 with equipment. Foundry building now under way is being erected by Austin Co., Cleveland, previously noted in these columns, and will cost about $100,000 with equipment.

Michigan Macaroni Mfg. Co., 3265 Bellevue Street, Detroit, plans rebuilding part of manufacturing and processing plant recently destroyed by fire. Loss close to $85,000 with equipment.

Yellow Truck & Coach Mfg. Co., Pontiac, Mich., plans one-story addition, 120 x 500 ft., for which bids will be asked soon on general contract. Cost over $175,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Middle West

● **S. E. Hokin & Co.,** 3333 West Forty-eighth Place, Chicago, steel products, plans new one-story plant, 100 x 130 ft., at Kildare Avenue and Forty-fifth Street. Cost close to $65,000 with equipment. A. Epstein, 2001 West Pershing Road, is engineer.

Commonwealth Edison Co., 72 West Adams Street, Chicago, plans two-story addition to machine and mechanical shop at California Avenue and Roscoe Street. Cost close to $80,000 with equipment. Holabird & Root, 333 North Michigan Avenue, are architects.

Malleable Iron Range Co., Beaver Dam, Wis., stoves and ranges, parts, etc., plans two-story addition, 100 x 200 ft. Cost over $75,000 with equipment.

Commanding Officer, Ordnance Department, Rock Island Arsenal, Rock Island, Ill., plans purchase of machine tools for arsenal; also welding trucks, tool and bench trucks, spare parts for trucks, machine shop trucks, bomb service trucks, instrument repair trucks, small arms repair trucks, bomb trailers, tank trailers, 240-mm. howitzer trailers, tool sets for light tanks, 155-mm. gun carriages, 37-mm. tank gun mounts, 155-mm. howitzer carriage adapters for high-speed towing, extractors for dummy projectiles, pedestal mounts for guns in trucks, elevators for machine gun tripods and other equipment. Appropriation has been authorized.

LaSalle Steel Co., 919 North Michigan Avenue, Chicago, has let general contract to Hughes-Foulkrod Co., Schaff Building, Philadelphia, for two one-story additions to mill at Hammond, Ind., 96 x 100 ft., and 80 x 105 ft. Cost over $85,000 with equipment.

Sturgeon Bay Ship Building & Dry Dock Co., Sturgeon Bay, Wis., plans one-story shop addition. Cost close to $40,000 with equipment. G. J. Feldhausen, 1464 Elm Street, Green Bay, Wis., is architect.

Pacific Coast

● **Aluminum Co. of America, Inc.,** 5151 Magnolia Street, Vernon, Los Angeles, has begun work on five one-story buildings, for which plans recently were filed, 240 x 340 ft., 180 x 240 ft., 160 x 220 ft., 120 x 240 ft. and 80 x 100 ft., respectively, for heat-treating, press and remelting, run-out, storage and distribution and other service for aluminum parts for airplanes. Cost over $350,000 with equipment. Main offices are in Pittsburgh.

Bureau of Reclamation, Denver, asks bids until Aug. 26 for automatic floats, control-shaft operating mechanisms, position-indicator receivers, regulating valve actuators, and position indicators for drum-gate control equipment at Grand Coulee, Wash., power dam (Specification 1408-D); until Sept. 3, bus structures for power plant, same project (Specification 931); until Sept. 6, two 250-ton motor-operated, double-trolley overhead traveling cranes for Shasta power plant, Central Valley project, Cal. (Specification 929).

John Bean Mfg. Co., Division of Food Machinery Corp., Julian Street, San Jose, Cal., spraying equipment and kindred products, has low bid on general contract from C. N. Swenson Co., 355 Stockton Street, for one-story addition, 70 x 300 ft. Cost over $125,000 with equipment. Binder & Curtis, 35 West San Carlos Street, are architects. Main offices are at Lansing, Mich.

Constructing Quartermaster, Quartermaster Corps, Hill Field, Ogden, Utah, asks bids until Aug. 26 for 276,500 ft. of galvanized steel wire (Circular 6585-9).

American Pipe & Steel Corp., 230 Date Avenue, Alhambra, Cal., steel pipe, flanges and kindred steel products, has let general contract to Consolidated Steel Corp., Los Angeles, for one-story addition, 50 x 200 ft., for storage and distribution. Cost close to $40,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 27 for two electric arc welding sets and 20 welding outlet panels (Schedule 2687) for Mare Island Navy Yard; 8000 lb. close-link crane chain (Schedule 2686) for Puget Sound yard.

Canada

● **Brading Brewers, Ltd.,** Wellington Street, Ottawa, Ont., plans new one and multi-story addition for increased capacity. Cost close to $200,000 with equipment.

Canadian Power Boat Co., Ltd., 1010 St. Catherine Street West, Montreal, motor boats, parts, etc., has let general contract to Atlas Construction Co., Ltd., 679 Belmont Street, for one-story addition, 250 x 440 ft. Cost over $150,000 with equipment. T. Pringle & Son, Ltd., 485 McGill Street, is consulting engineer.

Prenco Progress & Engineering Corp., 60 Front Street West, Toronto, has been formed to manufacture airplane parts, etc. Company has taken over plant of F. A. Colyer Co., on Jarvis Street, for manufacturing purposes pending arrangements for more extensive facilities. J. K. Chmel is president.

Department of Munitions & Supply, Ottawa, C. D. Howe, Minister, will build ordnance plant on the Lake Shore Road, Long Branch, Toronto, to provide 100,000 sq. ft. floor space.

Dominion Engineering Works, Ltd., First Avenue, Lachine, Que., has awarded general contract to Foundation Co. of Canada, Ltd., 1538 Sherbooke Street West, Montreal, for addition to erecting shops to cost $70,000.

Canadian Industries, Ltd., 1135 Beaver Hall Hill, Montreal, let general contract to Fraser Brace Engineering Co., Ltd., 107 Craig Street West, for erection of plant in province of Quebec to cost $500,000.

Hamilton Gear & Machine Co., Ltd., 76 Van Horne Street, Toronto, has awarded structural steel contract to John T. Hepburn, Ltd., 18 Van Horne Street, for plant addition. Cost approximately $75,000.